The Engineering and Mining Journal

WITH WHICH IS CONSOLIDATED "MINING AND METALLURGY."

VOL. LXXVII. NEW YORK, THURSDAY, APRIL 14, 1904. No. 15.

THE ENGINEERING AND MINING JOURNAL. ESTABLISHED 1866

PUBLISHED EVERY THURSDAY,
261 BROADWAY, NEW YORK

TELEPHONE 6865 CORTLANDT. P. O. BOX 1833.
CABLE ADDRESS "ENGMINJOUR" NEW YORK.

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DORTMUND, GERMANY . . . . Arndt Strasse, 56

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To FOREIGN COUNTRIES, INCLUDING POSTAGE, $8.00 or its equivalent: 33 Shillings; 32 Marks; or 40 Francs.

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THE ENGINEERING AND MINING JOURNAL.
Entered at New York Post Office as 2nd Class matter.

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EDITORIAL.

IN A RECENT issue, reference was made to the possible influence of the war between Japan and Russia upon the copper market. We now find that this war has had a decided effect on a minor, but still important, market, that for platinum. The call on the Russian reserves carried off a large number of the men who worked in the platinum placers of the Urals, reducing production to a great extent. The diminished supply accompanies increasing demand, so that a scarcity of platinum is probable.

THE STEADY INCREASE in the weight of rails used is shown by the fact that more than 40 per cent of the rails made in the United States last year were of sections weighing over 85 lb. per yard. It is only a few years since 85-lb. rails were exceptional; now they are common, and 100-lb. rails are used on a number of roads.

THE ARTICLE ON the filter-press treatment of slimes in Western Australia will be read with interest by that large body of hard-working metallurgists who are devoting their time and skill to improvements in cyanidation. Mr. Prichard writes not as a mere scribe, but as one having the authority which comes from the successful application of ideas in practical work.

The filter-press is yet young; Western Australia is the only region using it on a large and extensive scale; in this country it is being used at the Silver King mill, in Utah; while in Mexico, La Lustre mine has adopted it; in Korea, the British & Korean Corporation has installed a plant, and in Costa Rica, the new mill of the Tres Amigos is designed to employ the process. These are only a few instances which might be quoted. There are several mills which have tried the filter-press on a small scale, and we trust that Mr. Prichard's contribution will stimulate other metallurgists to state the results of their experience.

THE PRODUCTION of bessemer steel in the United States last year, as stated by the American Iron & Steel Association, reached a total

of 8,577,228 tons, showing a falling off of 561,135 tons from the total reported in 1902. This decrease was almost entirely in the closing quarter of the year, and was the result of the falling demand manifested in that quarter, and the consequent closing of a number of works. Nearly all this steel was made by bessemer converters of the ordinary type. Two Robert-Bessemer plants and seven Tropenas plants were in operation, but the output of these was relatively small, and was used almost entirely for steel castings. The production of rails, however, from bessemer steel was very nearly the same in 1903, as in the preceding year, showing a decrease of 62,710 tons only. The rail production absorbed about one-third only of the steel made last year.

The confusion created by the want of standard units of measurement is well illustrated in the case of the Australian unit of water measurement, the 'sluice-head.' In New Zealand, it means a cubic foot per second, which in practice is usually taken at 50 cu. ft. per minute; but in Tasmania it is only 24 cu. ft., and in Victoria it varies in different districts, but may be taken at 22 cu. ft. In the other States it is badly defined, but the 'box sluice-head' is approximately 29 cu. ft. and the 'ground sluice-head' 172 cu. ft. Here, obviously, is a duty awaiting the Australian Institute of Mining Engineers; let them appoint a committee and decide upon a standard which shall serve as a basis for water measurement throughout Australasia. Some day—before the Greek Kalends—we may expect the 'miner's inch' and the 'sluice-head' to give place to a more scientific unit; until then, let us at least know the exact meaning of such terms as we are compelled to use.

The United States Steel Corporation at last seems to have come to a decision with regard to prices of steel products. At the meetings of the various pools, in which, of course, the Corporation has a controlling voice, it was decided last week to continue the present schedule of prices, and in some cases to make small increases. This would indicate that the policy to be pursued is to endeavor to maintain quotations, rather than to increase or maintain production by offering inducements to consumers. This is a direct reversal of the plans followed by Andrew Carnegie, in building up his trade. The managers of the Steel Corporation have presumably considered the situation carefully with reference to their own prospects and necessities, but it may fairly be doubted whether in this case they have adopted the true policy. At any rate, they are giving a good opening to the independent concerns, which seem just now to be capturing most of the trade.

When the domestic demand for iron and steel began to decrease last fall, we heard a good deal about prospective export trade. A special organization was formed to handle the foreign business of the United States Steel Corporation, and the railroads were asked to give special rates to the seaboard on foreign business. The export trade, however, does not seem to have materialized as yet, and foreign shipments in February were rather light, while our European advices have little or nothing to say about American competition. Apparently the Steel Corporation has abandoned, for the present, the idea of selling its surplus products abroad, which could be done, of course, only by making lower prices than foreign manufacturers, and considerably lower rates than are charged to home consumers. It is possible that, on careful consideration, the managers concluded that the profit in export business would be insufficient, and that it would be better to close mills, than to keep them running on low-priced material. It is quite possible, also, that in view of a Presidential campaign, into which tariff questions will necessarily enter to some extent, it was considered best not to furnish the object lesson of low prices to the foreigner and higher ones to the home consumer.

RAND PROSPECTS.

At last the shares of the South African mines have been stayed in their long-continued fall, and Kaffir market has put on an air of hopefulness. We trust this is the beginning of better days for our engineering friends at Johannesburg. As soon as the first batch of Chinese coolies reaches the Rand and the labor experiment is fairly begun, there will be a further stimulus to mining activity. As to the rights and wrongs of this solution of a grave difficulty, we cannot pass judgment at this distance, preferring to rely upon the views of men of high character and sound judgment. Lord Milner, a great proconsul, a most conscientious and thoroughly capable man, said recently that the arrangements under which the Chinese will work on the mines of the Rand "are identical with those which have been introduced, identical with the system which prevails, and has prevailed for years, with the full knowledge and approval of the British Government and people, in many other colonies of the British Empire." He also said this: "I reckon, and I stake my reputation on the correctness of the reckoning, that for every 10,000 colored laborers you can obtain in addition to your present supply, you will, within three years, have 10,000 whites—men, women, and children—added to the population of this country." These statements cover both the sentimental and economic aspects of the case; such words from such a source carry more conviction than any amount of newspaper talk and political harangue.

While matters are being straightened out in the Transvaal, the Cape Colony is emerging from political strife with the promise of a better day—wise government and industrial prosperity. Dr. Jameson, of the Raid episode, is premier, and it speaks volumes for the character of the man that after the miserable fiasco which almost obliterated his previous fame as an administrator, he should have emerged again out of the ruck of incompetents to be a successful leader in that work of reorganization, which is destined to make South Africa a great confederation of English speaking states. We view these developments with interest, because, among other reasons, they affect the welfare of many of our professional brethren.

COST OF MINING ANTHRACITE.

We referred recently to the cost of mining anthracite as shown by the report of one of the large companies for 1903. The Delaware, Lackawanna & Western Company, which operates its mines directly, without the intervention of a subsidiary company, reports for last year a total of 9,130,680 tons mined and purchased; the cost of mining and preparation was $1.79 per ton, an increase of about 20 cents over 1902. It is useless, of course, to make any comparisons with an abnormal year like 1902. The figure given above is the cost only of mining and preparing for market. The additional cost of transportation to market is given at $1.95 per ton, and the expenses of handling and selling at $0.19; the total cost of the coal when delivered to the purchaser being $3.64. The average selling price of all the coal sold was $3.98, so that the apparent profit to the company was only $0.34 per ton. Included in the sales, however, were 104,571 tons sold directly at the mines, which brought only $2.01 per ton, and 1,207,358 tons used by the company, which are charged in the accounts at an even price of $1 per ton. Why this low price should have been fixed for the company's coal we do not know. The probability, however, is that nearly all of this coal was small or steam sizes, which sell much below the average price of the larger sizes of prepared coal. If we deduct the sales at mine and the company's supply, we find that the sales at a distance from the mines amounted to 7,324,415 tons, and that the average price obtained for this coal was $4.495 per ton. The Lackawanna mines, as a rule, are carefully and economically operated, and it is probable that the average costs here given are not far from the general average for the anthracite region.

As a sign of the closer working and greater economy now practiced in the anthracite country, we may mention that no less than 1,004,597 tons, or over one-tenth of the coal shipped last year by this company, was furnished by the washeries, which are operated on the old culm piles around the mines. This coal is nearly

all of the steam sizes, but it is obtained from the heaps which were formerly thrown aside as waste.

The Delaware & Hudson Company, while its report gives fewer details than that of the Lackawanna, shows rather higher costs. The coal mined is charged at $1.93 per ton; but, on the other hand, transportation expenses were lower, and the total reached only $2.78. This, however, is probably due to some peculiar conditions under which the Delaware & Hudson tidewater coal is sold.

INCORPORATION LAWS.

The disclosures in connection with corporate enterprises in London and New York alike will serve a good purpose if they draw the attention of investors to the disregard of existing laws, and the absence of other such regulations as an unfortunate experience demands. Among the anomalies of current methods is the incorporation of companies in States other than that in which their business is done, merely to secure freedom of restraint and avoid responsibility. If an English industrial or mining enterprise were to incorporate in France, or a French company were to secure its charter in Germany, the effort to escape responsibility at home would evoke strong suspicion of wrong-doing. But a California mining company incorporates under the laws of Delaware, or a Pennsylvania corporation gets its legal existence in New Jersey without exciting particular remark. New Jersey, Delaware, Maine and Connecticut are all States which are in fashion among the promoters of financial organizations. New Jersey has won wide notoriety as the hatchery of companies and has done a roaring trade in the incorporation business. Now Maine is becoming popular, largely because New Jersey charges one-tenth of one per cent annually as a franchise tax on the stock of a corporation of $3,000,000 or less; one-twentieth of one per cent on a capital ranging between $3,000,000 and $5,000,000, and $50 per annum on every additional million; this amounts to $1,000 on every million up to three and $500 per million up to five, when the increase of $50 per additional million is levied. In Maine it costs only $5 per annum to naturalize a corporation of $50,000, and so on up to a capital ranging between $500,000 and $1,000,000, when the tax becomes $50. Above that amount there is an additional charge of $25 per million.

New Jersey's business in corporations is falling off; during the month of March, just closed, the corporation department of the Secretary of State's office received, in filing fees from the granting of charters, only $9,733 as compared to $32,904 in the corresponding month of 1903. This falling off is not only on account of her high rates, but because of the discovery that the exceptional laxity of her laws makes it too easy for the promoters, at the expense of the investors; in other words, her laxity, which was the very factor that made New Jersey popular among certain fiscal agents, has been overdone to an extent which has attracted the notice of the public.

Delaware once offered sundry advantages, so that a company formed in that State could do just about anything, as the charters of one or two defunct corporations have abundantly proved; in fact, Delaware drew forth the dictum of a distinguished professor of law that it was a dangerous State in which to incorporate, with the result that its corporation laws were amended until it became more reputable and, we regret to say, less popular.

Connecticut can lay claim to one marvelous production, the Consolidated Lake Superior Company, with its numerous annexes of incorporations, quite sufficient in themselves to distinguish the three years during which the corporation department of Connecticut has been doing business.

The palpable evasion of responsibility evinced by the legalizing of enterprises far from home, and the notoriety won by New Jersey, especially, as a convenience for evading restraint and taxation, afford a cynical comment on the long-suffering of the investing public such as no moralizing is needed to emphasize.

WHEN SAMPLING FAILS.

In the course of the recent protracted discussion on sampling, no particular consideration was given to cases before which all system is helpless; when either the ore occurrence is so erratic that the usual methods of calculation break down hopelessly, or, as more frequently happens, the exigencies of time and money put an insuperable bar to the carrying out of a proper detailed examination. This is a problem worthy of discussion.

A man who obstinately, or unintelligently, applies a set system based on suppositious uniformity to the measurement of essentially erratic, here-and-there, occurrences of ore, is no wiser than one who might attempt to put a foot-rule on a will o' the wisp. System stands disarmed before disorder; at times, the multiplicity of rock-fracturing produces a distribution of ore which follows no definite line or shape discoverable to the miner. The inexperienced man, or he who leans too hard on set methods, then either confesses his inability to arrive at a reliable appraisal of values, or, loath to recognize his limitations, flounders into a morass of guesswork, from which he will eventually emerge a sorry sight. Under such circumstances, one can recall Huxley's definition of science as organized common sense, and apply that simple kind of science which is known as 'horse sense,' putting to one side, for the moment, those elaborations on the same basis which are termed technology.

It is impossible to forecast a method applicable to all sorts of conditions; each mine will require different treatment. Sometimes it is well to set to work and find out, by sample and assay, which minerals carry the metals, or which constituent portion of the gangue characterizes rich ore; in some mines a particular dark-blue quartz is rich; in others gray copper, or fahlerz, is a bearer of precious metals; in others fine-grained galena is indicative of silver, or certain forms of pyrite are favorable to gold; in most mines some such relation is discoverable. When once determined, such a fact will afford a clue by which it is possible to get a general, rough, but fundamental, notion of the value of the lode in stopes and levels, without carrying out a detailed sampling. In copper, lead, or zinc mines, the knowledge of the percentage composition of different minerals, and close observation of the proportions of them observable in the various workings, will enable an experienced man with a keen eye to make remarkably close approximations to fact. Of course, such estimates are merely approximations, and are only warranted in default of time and money to carry out a complete investigation by sampling and assay.

Among our readers, there must be many who have been called upon to make the best of a hurried investigation, and if any of them care to recite their experiences, we feel certain that the discussion of the matter will prove of service to the younger men. Whoever helps youth builds for the future.

MARKET CONDITIONS.

April 13.

The metal markets have been quiet, with comparatively little change from last week.

In copper, manufacturers seem to be fairly well stocked for the present, and not inclined to lay in supplies for any considerable time ahead, so that transactions have been on a moderate scale. The recent heavy exports seem to have satisfied the foreign market for the present, and buying has been rather light.

Tin is firm, with only slight fluctuations, and a fair demand.

Lead continues steady, without change in prices, and with about the usual consumption.

Spelter remains strong and demand seems to be very good. There is even some complaint of scarcity of spot metal. In the Joplin ore market, prices continue high, owing to the competition of smelters for ores.

Silver remains rather quiet, but the market is still in a sensitive condition, and very slight influences serve to throw it either way.

The iron markets are rather quiet, a slight reaction having, apparently, set in from the improvement of recent weeks. Buying has

fallen off somewhat in pig iron and billets. Consumers do not seem inclined to take any contracts for the second half of the year, and most of the larger ones are provided for up to July. The billet, plate and structural pools have decided to continue present prices.

The Western coal markets are quiet, domestic demand having fallen off with the season, while manufacturing consumption has not increased. The probable late opening of the lake trade also aids in making matters dull.

The Atlantic seaboard bituminous trade shows no marked change. Coal is arriving at tidewater more freely, and a heavy tonnage has been taken on contract since wage scales in the mining regions were settled.

The anthracite trade is very active, there being a strong demand from all consuming territory, except points taking their supplies by the lakes, as lake navigation is not expected to open for nearly a month. The April output of the mines will be heavy.

METALLICS.

Culled from all sources. Our readers are invited to assist this department by sending similar material.

The largest producer of sulphur is Sicily; its deposits occur in Miocene limestone, with unaltered beds of gypsum below, and it exported in 1903 475,508 tons, of which nearly one-third was for the United States.

South Africa contributes about 95 per cent of the world's supply of diamonds, the trade being thus controlled by the De Beers Consolidated mines, which, in the year ending June 30, 1903, recovered 2,475,802 carats, valued at £5,241,173 ($25,507,042).

The first asphalt pavement was laid in Paris in 1838, and since then the demand for this purpose has warranted an annual production throughout the world of 450,000 to 500,000 metric tons of asphaltum and bituminous rock. The consumption in the United States alone in 1903 was over 250,000 tons, which is equivalent to more than one-half of the average production in the world.

An extensive salt industry has been established in Utah by pumping the water from the Great Salt Lake into a series of evaporating ponds which cover over a thousand acres. In August pumping ceases, and a layer of salt 7 in. deep is found to be deposited from 49 in. of lake water. The yield of salt is at the rate of 150 tons per inch depth per acre.

The portion of the great terminal moraine extending from Wisconsin to Ohio has yielded a number of diamonds, some specimens being of good size and exceptional quality. One geologist, basing his conclusions on the direction of the striae observed in the underlying strata, has expressed the opinion that the diamonds have come from Ungava, east of Hudson Bay. This view is questioned, however, by others, who believe that the morainal material and the included minerals have been carried only a short distance from their source, probably from the region immediately north of the Great Lakes.

BORT.

Carbon, carbonado and black diamond are terms expressive of practically the same product—bort—which is marketed in America to the extent of something like $800,000 annually, and pays no duty. This valuation, it should be stated to avoid confusion, does not include the imports of small uncut diamonds used by miners, glaziers and engravers, which are included with gems in the returns.

Bort is an opaque, massive mineral with a crystalline, sometimes granular or compact structure, resinous to adamantine luster, and hardness equal to or slightly in excess of the gem diamond. It is also very brittle and will not stand a shock or blow, but friction does not affect it.

The black diamond occurs in commercial quantity only in Brazil. There it is found associated with the more precious stone, in river-beds beneath the silt and on top of the stratum of clay, on mountain sides, and elsewhere, particularly in the provinces of Bahia and Minas Geraes. The diamond-bearing fields in Brazil are owned and leased by the State, which also taxes exports at 13 per cent ad valorem. The black diamond is not found in South Africa, notwithstanding the extensive diamantiferous deposits that are being exploited there.

In Brazil the bort recovered varies in size, and on several occasions some very large stones have been found. Perhaps the largest ever discovered was in 1895, when a stone weighing 3,075 carats was marketed abroad at an extraordinarily high price. To be of commercial value, however, these large stones must be broken to sizes weighing from 1 to 3 carats—a rather expensive operation, as there is always a loss, since they have no cleavage planes. Bort, weighing from 1 to 3 carats (a carat is equivalent to 4 grains) is worth in New York at the present time $10, $13, $15 and $18 per carat, the prices varying with the size of stone required.

The uses to which bort may be put are many, as it will stand the severest test for mechanical purposes without apparent wear, especially where there is considerable friction and when the hardest steel cutter will not hold an edge. Bort is exceptionally well adapted for drilling, sawing, reaming, planing, turning, shaping, carving, engraving, and dressing various stones, metal, etc. Also for turning up emery wheels, paper calendar rolls, screw tops, and numerous other purposes.

Perhaps the most important of all its uses is in diamond drilling, a branch of industry that has been particularly active in recent years. For this class of work bort, round and hard, is most serviceable. Usually from 6 to 8 stones are set in the bit of a drill, and, when the rock is extremely hard, two more are added, being set on the outside of the bit directly opposite each other. The Turf Club bore-hole at Johannesburg, 4,800 ft. deep, was accomplished with Brazilian carbons that were worth about £9 per carat.

Other uses for bort that show expansion are in wire-drawing, in which a flat stone is preferred, and in stone-sawing, employing angular shapes. Each use has its preference for an individual shape and size of stone.

Bauxite received its name from Berthier, who discovered the mineral in 1821 at Baux, France.

A RECORD IN RAIL MAKING.

The *Bulletin* of the American Iron and Steel Association says that the building of the Edgar Thomson Steel Works was undertaken in 1873, but the works were not completed until 1875. When built they embraced two five-ton bessemer converters and a rail mill. The first blow was made on August 26, 1875, and the first steel rail was rolled on September 1, 1875. The Edgar Thomson plant was enlarged at an early day in its history and it has since been frequently enlarged. Its equipment to-day includes four fifteen-ton converters. The following table gives the annual production of bessemer steel rails by the Edgar Thomson Works, as reported to the American Iron & Steel Association, from 1875 to 1903, in gross tons:

1875	5,853	1891	264,469
1876	32,226	1892	330,511
1877	48,826	1893	230,336
1878	64,505	1894	220,337
1879	76,044	1895	324,778
1880	100,095	1896	300,776
1881	151,507	1897	477,363
1882	143,561	1898	561,757
1883	154,892	1899	604,343
1884	144,090	1900	626,831
1885	126,656	1901	708,113
1886	173,001	1902	709,906
1887	192,999	1903	675,214
1888	148,293		
1889	277,401		
1890	332,942	Total	8,207,625

This table presents the most remarkable metallurgical record that has ever been printed.

CARBIDE OF CALCIUM.—Ordinarily, the formation of calcium carbide requires a degree of heat which can only be secured in the electric furnace. At a recent meeting of the Academy of Sciences in Paris, M. Henri Moissan stated that metallic calcium, at a red heat, will combine with the finely divided carbon contained in smoke. The product is pure calcium carbide, crystallized and transparent.

MAKING PIPE JOINTS.—At the meeting of the American Society of Heating and Ventilating Engineers, January 19, 1904, there was a discussion of the question: "In making screwed joints, is it better to use some compound, or to make them up iron to iron with no compound?" In this connection, several bits of information as to why it is desirable to use some compound were given. Pipe fittings, and the threads on pipe ends are not always uniform, even when coming from the same maker. They usually rust and accumulate dirt before being used, so that they go together hard; threads do not fit precisely, and fittings may leak, particularly under high pressure; also threads not served with compound tend to cut when screwed together. Moreover, after the joint is made, the threads may rust together and make it difficult to unscrew the pipe. Red lead was formerly much used as a pipe compound, to lubricate, preserve and make a tight joint, but nowadays most steam fitting is done without red lead. Graphite and oil, mixed to the consistency of table oil, are now frequently used, and are efficient both for lubricating and making a tight joint. The compound should always be put on the male screw, and not daubed into the female end, to prevent its being crowded to the rear of the joint, and thus reducing the clear opening of the pipe. It is necessary to keep a constant watch over workmen to prevent them from putting compound into the female end, or putting it on too thick; a thin coating is sufficient to get the desired effect. Black asphaltum, about as thick as melted butter, is also used for making pipe joints, with successful results.

DISCUSSION.

Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the ENGINEERING AND MINING JOURNAL.

VALUING METAL PRODUCTION.

The Editor:

Sir.—Your correspondent "Investor," who criticizes my remarks on this subject, wanders from the main proposition. He is quite right, however, in stating that the whole subject is of no great importance. It is of importance only in so far as the values stated statistically may be rankly misleading. This is the case with respect to the Colorado statistics of zinc ore production, which drew out my remarks. Reference to the Colorado press, not to speak of certain more authoritative publications, will show the exaggerated idea it is sought to convey. "Already the value of our zinc is in excess of that of our lead," it is said, or similar remarks. Now, such statements do have a certain practical effect, tending to mislead the less well informed.

The Joplin miner sells so many tons of concentrates, not so many pounds of spelter, says "Investor." But the price he receives for his concentrates is based on the pounds of spelter they will yield, minus the cost of producing the spelter, and therefore on the value of the metal in the ore at the mill. The Leadville miner sells his ore in precisely the same way; this is a flat contradiction to "Investor." The writer, as professional adviser to buyers of these ores, pretends to a certain knowledge of the conditions. The Joplin miners got about $8,000,000 for their output in 1903; actually got it. The Leadville miners probably got about $600,000; when their statisticians reckon a value of upward of $4,000,000, the importance of Leadville is improperly exaggerated. No zinc ore was smelted in Colorado previous to 1903; in that year only a comparatively little. A large quantity is exported to Europe, where spelter has been fetching a lower price than at New York. The Colorado statisticians not only compute all this at the New York price, but also they compute spelter which is not produced, that is, they do not allow for the loss in the process, in this case a large one.

Statistical valuations are difficult to make accurately; they are apt to be useful if the data be reliable. In the occasional references to authoritative compilations I have been from time to time obliged to make, I have noticed that a distinction is not uncommonly made between mineral production and metallurgical. The latter is frequently given a nominal value, as "Investor" suggests. The aim appears to be, however, to reckon the value of minerals at the point of production. What has been said herein as to zinc ore and spelter applies equally to silver-lead ore and its products. The manner in which silver-lead ore is sold in Colorado makes it difficult to compile true and prompt statistics of its value at the mines; it is not so difficult to arrive at what is at least a fair approximation in the case of the zinc ore.

The opinions expressed in my original communication were held by the late R. P. Rothwell, who had some reputation as a statistician. There is no objection to computation of the metal production of the United States, or of the individual States, at the New York prices for certain brands in order to arrive at value-totals, which can be footed up; "Investor's" defense of that practice shows how far he wandered from my proposition. There is an objection to valuing the ore production of various mining districts at the New York prices of their metal contents, on the grounds I have already pointed out; and one more, which should appeal especially to "Investor," since it touches his chief argument, the totals can not be fairly added up because the counters are different.

However, except to statisticians and "boomers" (asking pardon for the couple), the whole question does not appear worthy of much consideration. During the last three months, I have been called upon to examine several sets of documents presenting Colorado zinc propositions, which have been accompanied by newspaper clippings setting forth that zinc mining in that State is now a large and profitable industry, that the value of the zinc output in 1903 was nearly $4,500,000, and exceeded the value of the lead output, etc., etc. If I may be permitted to paraphrase the last paragraph of "Investor's" communication, it reads to me more like the contribution of a "boomer," who is interested in magnifying results and objects to disclosure of the hard facts, than like the statement of a practical man in the business who wants to see things as they are. I may be doing him an injustice, but that is the way it looks to R. W.

New York, April 10, 1904.

THE CONSTRUCTION OF WATER JACKETS FOR BLAST FURNACES.

The Editor:

Sir.—My attention has been called to a patent granted to Frank Klepetko by the United States Patent Office, No. 743,731, patented November 10, 1903, application filed August 8, 1902. The patent covers an alleged improvement in the construction of water jackets for blast furnace purposes, the object being to construct a water jacket, the inner walls of which should present an uninterrupted, unbroken and seamless surface to the ore charge, so that the starting of a leak would be practically impossible. Five claims are allowed. All are the same in general tenor.

Claim No. 5 practically covers the whole of the invention, as follows: "A water jacket comprising an inside and an outside sheet, a series of flanged spacing-walls disposed within the jacket in planes parallel to the axis of the furnace, the flanges of the walls being secured to the outside sheet, and the longitudinal edges of the webs thereof serving to support the inside sheet along the inner surface thereof."

In the specifications it is stated as follows: "It is found in practice that a jacket provided with stay-bolts when heated expands differently in different parts, due to unequal heat in the furnace, thereby producing an undue strain in some of the bolts and a buckling of the sheets. This buckling and undue strain causes a leak around the bolt, necessitating the shutting down of the furnace."

In reference to this patent, I would state that in 1900 and 1901, water jackets constructed almost identically as described in the patent granted to Mr. Klepetko, were tried in the smelters here in Butte, Montana. It was found that the inner sheet buckled and warped very quickly, and after a short run the jackets were thrown out on account of the deep corrugations, which rendered it unsafe to continue the use of this style of jacket any longer. From practical experience we have found that the more stay-bolts there are between the inner and outer sheets, the better service we get from the jackets. We have used water jackets with the stay-bolts spaced 12 in. apart, but the last jackets put in by us are spaced 8.5 in. apart, and give much better results.

A. H. WETHEY.

Butte, Mont., April 4, 1904.

LABORATORY EQUIPMENT IN TECHNICAL EDUCATION.

The Editor:

Sir.—In the admirable paper on 'Laboratories for Advanced Instruction,' an abstract of which appeared in the JOURNAL of March 24, H. C. Jenkins presents some of the principles upon which the courses of modern mining schools are, or should be, based. The desirability of a school course for a mining man is now so generally recognized that it is no longer necessary to support by proofs the assertions that "the tail end of a truck" is not the highest "seat of learning;" that when the graduate of such a seat of learning proves an efficient manager the credit belongs rather to the man than to his schooling; and that while perhaps more capable in certain few respects, that man does not rank as high in his profession as the same man would, did he possess the advantages of school instruction in addition to practical experience. While all this is now recognized, there is still room for differences of opinion regarding the functions of a mining school, the degree of attention the various subjects should receive, the proportions of time to be spent on theoretical and on purely practical subjects, if not, indeed, regarding the very subjects to be included in the school curriculum.

It is agreed, of course, that the ultimate end to be attained is the production of the intelligent, judicious, *efficient* superintendent. But it may be doubted if the best results are to be obtained by attempting to turn out the finished product directly from the school. Even with the four years' courses which have been adopted in most colleges in America, this is attempting too much and will result in lopsided development.

In well-furnished schools with thoroughly equipped laboratories, and with students keen on the "bread and butter" subjects, because in these results are tangible, there is a distinct danger of too much specialization, a tendency to add too much top-dressing, to build a heavy superstructure on a slender foundation. The product of such a course will resemble in many respects the graduate from the truck, though perhaps somewhat lacking in the hard-headed "horse sense" of the latter.

The particular office of the school should be to afford a training in those branches of the profession, and in the cognate subjects, in which the student as a practical worker will receive little or very inefficient training. It should aim to supply from the experiences of his predecessors in the profession the valuable knowledge that could be gained by the individual only from long years of personal experience, if at all; to thoroughly ground the student in the fundamental principles upon which the science of his profession is based

and to teach him to apply these principles; to train his mind to think, to examine critically, to weigh evidence, to judge and to act along the lines of his professional work. In a word, its aim is to educate the student in a particular branch of knowledge.

The answer to the question: What should be taught? depends upon the very nature of education. "Education is never a taking on from without of some grace or skill or knowledge. It is the unfolding from within into some new power, the flowering of some quality hitherto dormant. The essence of culture is not possession of information as one possesses an estate, but absorption of knowledge into one's nature, so that it becomes bone of our bone and flesh of our flesh. It means the enrichment and expansion of the personality by the taking into ourselves of all that can nourish us from without." Few men can become educated in mining and metallurgy by practical work and their own unaided efforts, nor with the help of instruction in rule-of-thumb as supplied by Correspondence Schools, though they may be able to greatly increase their efficiency as tradesmen. For this education, the full equipped laboratories of the schools are necessary, but they are to be used in the way which Mr. Jenkins mentions.

The function of the mining school, then, is to truly educate the student in particular branches of applied science. Without some little education in pure science as a foundation this is an impossibility. It is here that differences in opinion may arise. How much pure science should precede specialization in mining, metallurgy, etc.? In some colleges in certain sciences there may be too little, both from educational and technical standpoints. In this age there is little danger of error in the other direction. For example, in some schools geology is dismissed after a brief general treatment. Yet upon some more or less clearly defined geological theory mining operations must be based. The mining engineer should know at least enough geology to form an intelligent conception of the nature and character of the economic deposits he is interested in, and their relationship to the enclosing rocks. He should know enough to appreciate the value of mining geology and the use that may be made of mining geologists. A brief course in geology is insufficient for this purpose and it is not safe to rely upon this knowledge being gained by personal observation in practical work or by private study. It may best be obtained during the school course.

To round off his college training the future superintendent must obtain practical experience. While, as Mr. Jenkins states, the superintendent need not be a skilled workman in the various trades utilized in mining operations, and need only be able to recognize good and efficient work, and know the conditions and limitations under which it can be performed, no improvement can be made on the old method of getting this knowledge by actually working at the trades. The experience in the works can be supplemented to advantage in the school laboratories. The experience in the works has also this advantage, it gives the future superintendent an opportunity to become thoroughly acquainted with workingmen; this is very necessary for one who is to lead and handle them. To be able to show a workman how to do better work gives a manager the firmest grip upon his men.

Such experience may be obtained by the student during his long vacations. The managers are usually willing to help the zealous student, partly because they recognize the value of the experience to the student and the value of having properly equipped graduates to draw upon, and partly because they find it entails no pecuniary loss. For the student anxious to make the most of his opportunity enters upon his task conscientiously, yet with the snap that characterizes him on the grid-iron, so that his work soon compares favorably with that of the ordinary wage-earner, who too often, when he is thinking of his work, is scheming to make a minimum of work bring a maximum of pay. In the school of mining at Kingston our experience has been that students can always obtain this practical experience, that they make highly satisfactory workmen, and that the results of such experiences are much better than those from the same class of work attempted in the school. Probably the best results accrue when the operations are conducted under the management of the school itself, for then not only does the student have an opportunity to copy the skilled workman, but he has trained instructors on the spot to call attention to the points to be specially observed and the lessons to be learned.

The aim of the school, then, as Mr. Jenkins emphasizes, is not to turn out a skilled workman, nor is it to turn out a full fledged 'expert,' but an educated graduate who is equipped to derive the greatest possible benefits from practical experience, and who is in a position to become the most efficient superintendent after the shortest possible apprenticeship.

R. W. Brock.

Kingston, Ont., April 2, 1904.

(Mr. Brock is professor of geology in the School of Mining at Kingston, Ontario.—Editor.)

NATIVE GOLD IN IGNEOUS ROCKS.

The Editor:

Sir.—The article by Mr. Walter Harvey Weed in your issue of March 17 entitled 'Original Native Gold in Igneous Rocks' I find of special interest because of the striking similarity of many of the occurrences cited therein to conditions found in this region.

The metamorphic slates and schists of this region have furnished much placer gold and afford the most promising field for permanent lode mining, but it is to basic igneous rock-masses that southern Oregon owes its name as a placer-gold producer. These masses include some serpentine areas, but are chiefly made up of diabases and diorites.

The primary character of the gold is questionable, as all these rocks have apparently undergone ordinary hydro-metamorphism as in the cases cited by Mr. Weed; furthermore, much of the gold is comparatively coarse and many rich pockets with gold in secondary quartz have been found. In such cases the enriching agencies have been confined strictly to pocket making; these are very limited in extent and show no contributing feeders, and generally speaking, quartz is scarce; there is very little pyrite and the rocks present the same massive appearance over large areas without any evidence of fracturing or mineral deposition; therefore, it seems reasonable to conclude that the native gold is an original constituent.

These rocks decompose rapidly, the finer grained diorites in particular, and upon the less disturbed surfaces decomposition takes place to considerable depths, presenting all stages of change from partly decomposed rock to yellow clay; in this condition the material presents what might be termed a porphyritic appearance due to the unequal decomposition of the contained minerals, and is called by the miners "yellow porphyry." When richer and more decomposable areas are so situated as to favor local concentration, the surface dirt and the joints and softer portions below are very rich, the gold being rough and angular and there is no quartz present; extensive sampling of the firmer rock in some of these rich areas shows value of from 10 to 25 grains per ton.

The wash of many rich stream-runs is composed almost entirely of one character of rock varying but little in color or crystalline texposed almost entirely of one character of rock, decompose even more readily than when in place, becoming so soft that they readily cut up and wash away under the pipe, and the covering of surface dirt becomes bright red. This red dirt, which unfailingly indicates the nature of the wash beneath, is considered as good an indication of the value of placer ground as a gossan capping is for a lode, and, consisting as it does of concentrated residual products, it is often very rich.

Willard Mallery.

Grant's Pass, Oregon, April 1, 1904.

TECHNICAL EDUCATION.

The Editor:

Sir.—Noting that you invite discussion upon the broad theme of technical education, the writer ventures a few words in connection with mining schools, on the question often known as 'Theory versus Practice.'

The phrase is misleading. It may not be out of place to mention that the writer has had to meet the question both "within and without." Leaving field practice to assume charge of the Colorado School of Mines, and subsequently relinquishing educational work to resume the field, he claims exceptional chances to have noted such defects in practice as may be traced to educational origins.

Here may be quoted with approval a paragraph in the article of H. C. Jenkins in your issue of March 24: "To take the simple case of ore concentration, a worker in a particular mill, even if it happens to be well designed, which is not always the case, will see only certain types of machines, used in some particular way, and in five out of six cases the opportunities will be very rare for him to know anything of the behavior of these machines when used in another way, upon some other material, or for him to know what other machines would do in their place." Using this paragraph (as did its author) merely as a text, it may be said that the most important principle of technical education lies in the inculcation of fundamental laws. These are also the hardest to impress upon the average student. The latter has yet to realize that masses of detail unconnected by scientific groundwork may be of little avail. He is, in short, impatient for results. Nor is he to blame, for in the first place, he is young, and in the second place there are thousands who should know better, at least according to their years, who constantly raise the cry of less "theory" and more "practice." Much of this demand reaches the ear of the student, and unless he is of a somewhat exceptional type he frets under his

daily tasks, asking: "What has this to do with mining?" and forgetting that true "practice" must always lie outside of the school walls.

Yet the writer feels sure that he will raise a loud "Amen" from many, in declaring that a majority of the errors encountered in practice result not from lack of knowledge of details, but from ignorance of scientific fundamentals. Illustrations, to bring them within reasonable limits, must be of the simplest kind. Those given are drawn from very recent experience.

In a mining report there was used in one place the word "decomposition" and in another "disintegration." "What is the use of employing two terms which mean the same thing?" was the comment of one reader, the graduate of a technical institution of world-wide reputation. For answer the author of the report smashed a brick with a hammer and requested his critic to specify the amount of "decomposition" it had sustained. This gentleman could probably have made a fair analysis of the "brick-bat;" but was his chemistry in a very "practical" condition?

Within the month there has been seen the attempt to increase oxidation by diminishing the supply of oxygen. The "attempter," to do him justice, did not so designate either the object or the means. But he was a "practical" man!

Aside from the actual commission of blunders, the lack of elements may result, and often does, in failure to know "what is the matter;" and by easy inference in not knowing how to rectify operations when they are going wrong. Again, things may really be "going wrong" but as some profits are still being made the management remains serenely unconscious of any possibility of doing better. Waste of this kind is actually more dangerous than when there is a current loss; the profit hides the blunders. Cases without number might easily be cited in which the trouble arises from lack of general principles.

Illustrations of the fact that, usually, some fundamental deficit is to blame rather than ignorance of ordinary details will occur to any one who has had much to do with experimental practice.

The writer believes in the utility of much student practice, some of which is indeed indispensable—draughting, chemical analysis, surveying, determinative mineralogy, and the like—but most of all he believes in thorough grounding in the established laws of nature. Call this "theory" if you will; none the less it constitutes the code by which must be regulated all successful "practice."

REGIS CHAUVENET.

Denver, Colo. April 2, 1904.

(Mr. Chauvenet was recently president and professor of chemistry in the State School of Mines, at Golden, Colorado.—EDITOR.)

CYANIDATION OF SANDS.

The Editor:

Sir.—The appearance in your issue of March 10 of the letter of Mr. J. E. Johnson, Jr., in reply to mine in the JOURNAL of February 18, has introduced a chapter of surprises and given an unexpected turn to the argument. In his original comment Mr. Johnson distinctly censured the use of the Blaisdell machinery in cyanide plants, on the ground of the equal efficiency and much greater economy in the use of the sand-shoveler of his own invention; while in the last letter he confesses ignorance of the cyanide treatment of sand and urges the use of his shoveler "from the general view of an engineering problem." Regarding the matter from his final point of view I had not, nor have I now, any comment to make. It is only when Mr. Johnson maintains the efficiency of the sand-shoveler in a cyanide plant to replace the excavator, that I must beg leave to insist upon my statement that the machine is not adapted to the requirements of the case.

In reply to Mr. Johnson's primary doubt, I will say that the sand, of all fineness, gets into the collecting tank without any previous classification—sand, slime, and water all together—and is there separated thoroughly and perfectly. For information as to this process I refer to the *Proceedings* of the Chemical and Metallurgical Society of South Africa, the first two volumes of which contain various papers upon the subject. I cannot see how the sand-shoveler would separate sand from slime except by having a trough of different cross-section to settle each grade of sand and a separate shoveler at work upon each grade. Even then each shovel would be sure to spill some part of its load, which would be carried beyond its appointed place, and, in the compartment for the removal of the very fine sand, such spilling would insure the carrying of a portion of the fine sand to the slime plant, where its presence is most undesirable. And this sort of separation would give a classification of the sands, which is also undesirable. Classification might be accomplished more easily and economically were it desirable. As far as separation goes, the Blaisdell machinery has nothing to do with the case. In the cyanide plant the separation is made without the use of power or expensive machinery, so that as a separator the sand-shoveler is superfluous.

Mr. Johnson states that he is sending me a sample of sand which was taken from clayey water by the sand-shovel. I have already considerably delayed this communication in the hope of receiving this sample, but it has not appeared. Copala is rather isolated and the mail service is uncertain so that I do not consider it wise to wait any longer for the appearance of the sample. I am perfectly willing to accept Mr. Johnson's word that the sample contains no slime. I should not expect it to, but I should rather expect his remaining slime to carry an undesirable portion of sand. Personally, I am strongly of the opinion that the question of distinguishing between sand and slime is the rock upon which the motive of the discussion falls to pieces. Unless one has been working with just such problems as require a thorough knowledge of the material, one will invariably class very fine sand as slime. And without a thorough understanding of this point further discussion is futile. A collection of different definitions given to slime has been presented by Mr. W. J. Sharwood in the JOURNAL for October 10, 1903.

With regard to the Blaisdell excavator, the machine will discharge a tank of sand cheaper than hand labor or any other form of machine now known, so that whether a tank is only discharged once as in single treatment, or twice as in double treatment or intermediate filling, the excavator eventually has to be used. It is true that the excavator aids greatly, chemically and physically, in the treatment, while Mr. Johnson's shoveler would deliver a product not well fitted for leaching, but for the sake of simplifying the problem, we may leave that out of consideration. Mr. Johnson admits the use of the centrifugal distributor. He must see now that the excavator is indispensable to discharge the tanks after treatment, if for no other reason. And the cyanide chemist in charge of works equipped with the excavator will feel inclined to get the greatest possible advantage of its presence.

As I see it, the field of the sand-shoveler does not coincide wholly nor in part with that of either of the Blaisdell machines. And its use as a separator is precluded on the ground of economy, whether or not it may prove its efficiency.

I quite agree with Mr. Johnson in his belief that "the machine is capable of assisting and advancing mill practice within its field," but the cyanide plant is not its field.

HERBERT A. MEGRAW.

Copala, Mexico, March 28, 1904.

(This discussion is now closed.—EDITOR.)

TAILINGS ELEVATORS.

The Editor:

Sir.—Apropos of the interesting paper by Messrs. W. H. Wood and E. J. Laschinger, which you print in abstract in the JOURNAL of March 24, the following notes concerning different devices for lifting stamp-mill tailings may be of general interest. They are the result of experiences in the 20-stamp mill of the Standard Consolidated Mining Company, at Bodie, California:

Air-Lift.—The problem was to raise 60 tons of the quartz sand and about 90,000 gallons of water per day 45 ft. This was equivalent to about 9.4 cu. ft. per minute, weighing 604 lb. The theoretical horse-power in consequence was less than 0.85. The efficiency of an air-lift is dependent upon the ratio of submersion to lift, and accordingly a double lift was determined upon, to avoid expense in obtaining submersion. A shaft was sunk under the mill and a 10-in. pipe placed in it, closed at the bottom. Within this a 3-in. lift-pipe was placed. This pipe gave a lift of 22.5 ft. above the top of the 10-in. pipe, and discharged into another 10-in. submersion pipe, with 3-in. lift as before, giving 22.5 ft. of additional lift. The air supply was from a Garden City rotary blower, capable of displacing 188 cu. ft. of free air per minute and delivering it at 10 lb. pressure. The air pipe was 1 in. and came down outside the lift pipe, turning up a few inches within the lower end. This device operated with fair success, but when part of the mill was idle, the lowered velocity in the lift-pipe allowed the heavier particles to settle against the uprising current and in time blocked the pipe. No tests for power consumption were made, but the efficiency would be at best poor. I have recently been using an air-lift for unwatering a mine under conditions where pumping was impossible, and have found everything satisfactory in its use, except the efficiency. This was about 12 per cent measured between the electric meters, measuring the current which operated the air compressor and the actual water thrown. The air pressure was, however, 85 lb.; in the case of the Garden City blower; giving but 10 lb. pressure, the efficiency would be better. It should be added that this efficiency was for the case of the submersion being equal to lift.

Bucket-Elevator.—This was also tried, but so much sand adhered to the buckets that, apart from the wear on the links, the system was not satisfactory, particularly during cold weather.

Centrifugal Pump.—This was used for a year or so for this service, notwithstanding the heavy wear. The consumption of metal from this cause was lessened by various expedients, but probably at best it amounted to 4c. or 5c. per ton of sand handled. Added to this was the high power consumption. The mill was operated by electricity, and meter measurements made at the main motor showed 15.5 h. p. as the consumption of the centrifugal pump, including belting, line-shaft running, etc. This may be considered by far the most serious drawback to the centrifugal pump for this work. I believe that the consumption of metal can be still further lessened by changes in design.

Frenier Pump.—This somewhat anomalous machine has been doing excellent service and has shown no excessive wear; the chief wearing part being the stuffing box in the axis. The power consumption is less than one-third that of the centrifugal pump. The speed must be closely adjusted to get good results, and the pump is sensitive to sudden increase or decrease of flow delivered to it, change in either direction causing the supply-box to overflow until the pump has adjusted itself to the changed condition. For ordinary work in small units it is by long odds the best of the machines enumerated above. As 45 ft. is an excessive lift for these pumps, we used two 54-in. pumps, one lifting to the other.

R. Gilman Brown.

San Francisco, April 4, 1904.

BESSEMER STEEL PRODUCTION IN 1903.

The American Iron & Steel Association has just published complete statistics, received direct from the manufacturers, of the production of bessemer steel ingots and castings in the United States in 1903; also of bessemer steel rails by the producers of bessemer steel ingots.

The total production of bessemer steel ingots and castings in 1903 was 8,577,228 gross tons, against 9,138,363 tons in 1902, a decrease of 561,135 tons, or over 6 per cent. The production of 1902 was much the largest in our history.

The following table gives the production of bessemer steel ingots and castings in the last six years. Of the production last year 17,099 tons were steel castings, against 12,548 tons in 1902:

1898	6,609,017	1901	8,713,302
1899	7,586,354	1902	9,138,363
1900	6,684,770	1903	8,577,228

Below is given by States the production of bessemer ingots and castings in the last two years:

	1902.	1903.	Changes.
Pennsylvania	4,209,326	3,909,436	D. 299,890
Ohio	2,528,802	2,330,134	D. 198,668
Illinois	1,443,614	1,351,968	D. 91,646
Other states	956,621	985,690	I. 29,069
Total	9,138,363	8,577,228	D. 561,135

There were no Clapp-Griffiths works in operation in 1903 and only two Robert-Bessemer plants were active. Seven Tropenas plants were at work, as compared with 5 in 1902. In addition one plant made steel by the Bookwalter process and one plant on the Pacific coast made a small quantity of steel in a special surface-blown converter. One plant also made steel by the Evans-Wills process. All these active works produced steel castings only.

The production of all kinds of bessemer steel rails by the producers of bessemer steel ingots in 1903 was 2,813,583 gross tons, against a similar production in 1902 of 2,876,293 tons. The production in 1903 was 62,710 tons less than in 1902, when the maximum production was reached.

The following table shows the production by States of bessemer steel rails by the producers of bessemer steel ingots in the last two years. Included in the figures given are 13,248 tons of renewed rails rolled by mills operated by companies which manufacture bessemer ingots.

	1902.	1903.	Changes.
Pennsylvania	1,148,425	1,125,546	D. 22,879
Other states	1,727,868	1,688,037	D. 39,831
Total	2,876,293	2,813,583	D. 62,710

The following table gives separately the production of rails weighing 45 lb. and less than 85 lb. to the yard from those weighing less than 45 and over 85 lb. to the yard. Bessemer rails made from purchased ingots or from re-rolled rails by companies which do not manufacture bessemer ingots are not included.

	1902.	1903.	Changes.
85-lb. and over	645,162	1,137,244	I. 492,082
Over 45-lb. and under 85-lb.	2,004,063	1,498,678	D. 505,385
Under 45-lb.	227,068	177,661	D. 49,407
Total	2,876,293	2,813,583	D. 62,710

There was a large increase in 1903 in the production of bessemer steel rails weighing 85 lb. and over as compared with 1902 and a considerable decrease in rails weighing 45 lb. and over and less than 85 lb. The production in 1903 of rails weighing less than 45 lb. also shows a decrease.

The total production of rails in 1903 will include rails made from open-hearth steel, rails rolled from purchased bessemer blooms, rails re-rolled by non-producers of bessemer steel ingots, and iron rails. The total from all these sources in 1902 amounted to 71,640 tons.

IRON AND STEEL IN SPAIN.

Statistics of iron ore production in Spain for the year lately closed are given by Don Adriano Contreras in the *Revista Minera* for March 24. The figures are given below, in metric tons, in comparison with those for the preceding year, by provinces:

	1902.	1903.	Changes.
Vizcaya	5,059,405	4,760,000	D. 299,405
Santander	1,133,530	1,360,000	I. 226,470
Murcia	629,421	735,000	I. 105,579
Almeria & Granada	365,945	725,000	I. 359,055
Other provinces	716,254	898,600	I. 182,346
Total mined	7,904,555	8,478,600	I. 574,045
Iron ore consumed	730,869	830,665	I. 99,796
Iron ore exported	7,560,020	7,692,214	I. 132,194

The chief exports last year were: To Great Britain, 4,947,028 tons; Germany, 1,889,329; France, 415,757; Belgium, 321,994; United States, 101,038 tons.

The production of iron and steel in various forms is reported as follows, in metric tons:

	1902.	1903.	Changes.
Pig iron	330,747	380,284	I. 49,537
Bessemer steel	103,389	105,263	I. 1,874
Open-hearth steel	60,175	94,379	I. 34,204
Total steel ingots	163,564	199,642	I. 36,078
Wrought iron	53,252	53,288	I. 36
Finished iron and steel	230,696	262,729	I. 32,033

Of the pig iron produced last year, 22,000 tons were made with charcoal; the rest with coke. There were 18 furnaces in blast during the year.

Exports of pig iron were 50,188 tons in 1903, against 31,526 tons in 1902. Exports of finished-iron and steel, chiefly bars, were 14,258 tons in 1903, against 11,329 tons in 1902.

The Sociedad de Altos Hornos de Vizcaya made 7,508 tons of tin-plates in 1903. The Compañia Basconia also reports 82,553 boxes of tin-plates, or about 4,300 tons, made last year.

MINERAL RESOURCES OF THE DUTCH EAST INDIES.

In a paper recently read before the Society of Mineral Industry in Paris, M. Bousquet reviewed the principal mineral production and resources of the Dutch East Indies.

In Sumatra and in Borneo there are many deposits of Tertiary coal. The principal mines are at Ombilien, Pengarou and Poeloe-Laoet. The Ombilien mines, which are worked by the State, produce about 200,000 tons of coal yearly.

The most profitable production is that of petroleum, of which the yearly output approaches 430,000 metric tons. The principal deposits of oil in Sumatra are in the districts of Perlak, Langat and Palembang; in Java, at Rembang, Soerabaya and Madoera; in Borneo, in the Roetei district. There are refineries in the islands having a capacity sufficient to treat all the oil produced. The refined oil is chiefly exported, while the residuum is used for fuel, a great part of it being consumed by the steamers trading in the islands.

Tin is found in alluvial deposits in the small islands of Banka, Billiton and Singkep. There are deposits in Sumatra and Borneo, but they are of low grade. The Banka mines are worked by the State, and produce about 12,000 tons yearly. The others are worked by private companies, the output from Billiton being about 5,000 tons yearly, while that from Singkep is less than 1,000 tons. The mining, or washing, is done entirely by Chinese miners; but natives of the island are employed to remove the waste or overburden.

Gold is found in Borneo, Sumatra and Celebes, both in alluvial deposits and in veins. There are several vein mines being operated, the principal ones being at Redjang-Lebong and Soemalato. Both these mines are rich, but the ores are complex, and difficult to treat.

Deposits of galena and zinc-blende exist in Borneo, and of copper in Celebes. Several of these deposits are now being explored. A peculiar industry exists in the Soerabaya district in Java, where iodide of copper is obtained from the waters of a group of mineral springs.

In Java there are quarries of very fine marble. Diamonds have been found in Borneo, on the west coast. They are obtained from the beds of certain streams by the natives. The production, however, is small, having been between 700 and 800 carats yearly for several years past.

COAL PRODUCTION OF NATAL.—The official figures show that Natal produced in 1903, 713,548 tons of coal, as compared with 599,821 tons in 1902. The exports for the two years were 298,873 and 250,969 tons respectively. In 1903 there were exported from Durban 7,533 tons, exported over land to Orange Colony and Transvaal 15,769 tons and bunkered at Durban 275,571 tons.

COAL-DUST FIRING.—C. H. Hurd, in a paper read before the Indiana Engineering Society, January 14, 1904, described some tests at the pumping station of the Indianapolis Water Company. Coal dust, pulverized in a ball and tube mill from the cheapest mining refuse, is blown into the fire-box of the boiler with an air pressure of about 2 oz. The boiler is rated at 200 h. p., but is regularly furnishing 250 h. p. The temperature at the burners is about 3,000° F., which is reduced to 400° F. at the breeching.

THE GUANAJUATO MINING DISTRICT.

By Robert T. Hill.

Mining in modern Mexico owes its recent advancement to successful steps in invention whereby old and overlapping processes have given way to newer and cheaper methods. Time and again the historic camps of Mexico would pause in their production as the limitation of ancient mechanical processes was reached. The successive introduction of modern explosives, air-drills, gasoline engines, and other appliances have made possible the beneficiation of ores previously unprofitable, and now long distance electric transmission of power brings into the range of treatment still further stores of mineral wealth.

The first miners of Guanajuato and Zacatecas broke out the ore by building fires against the rock, in exactly the way of the Romans as described by Pliny. The introduction of black powder and the invention of the *arrastre* and *torta* processes were relatively important steps in the history of mining in Mexico. Elsewhere the adoption of modern methods has stimulated development from time to time, but Guanajuato alone seems to have dragged in the procession of advancement, and to-day it is the most backward of the historic mining centers.

Guanajuato[1] is one of the oldest and most extensive mining districts of the new world, having been worked continuously since 1540. Its large production in times past, a matter of official record, is testified by the size of the excavations and works representing these past activities, and also by the city of Guanajuato, itself, which was built out of the products of the mines.

With a population of 50,000, with its narrow cobble-stone streets, its beautiful public buildings, parks and residences, its forty or more *haciendas de beneficio*, its statues and fountains, and houses which rise in tiers above the narrow ravines, Guanajuato is a city which represents the ultimate evolution of what was originally a placer diggings.

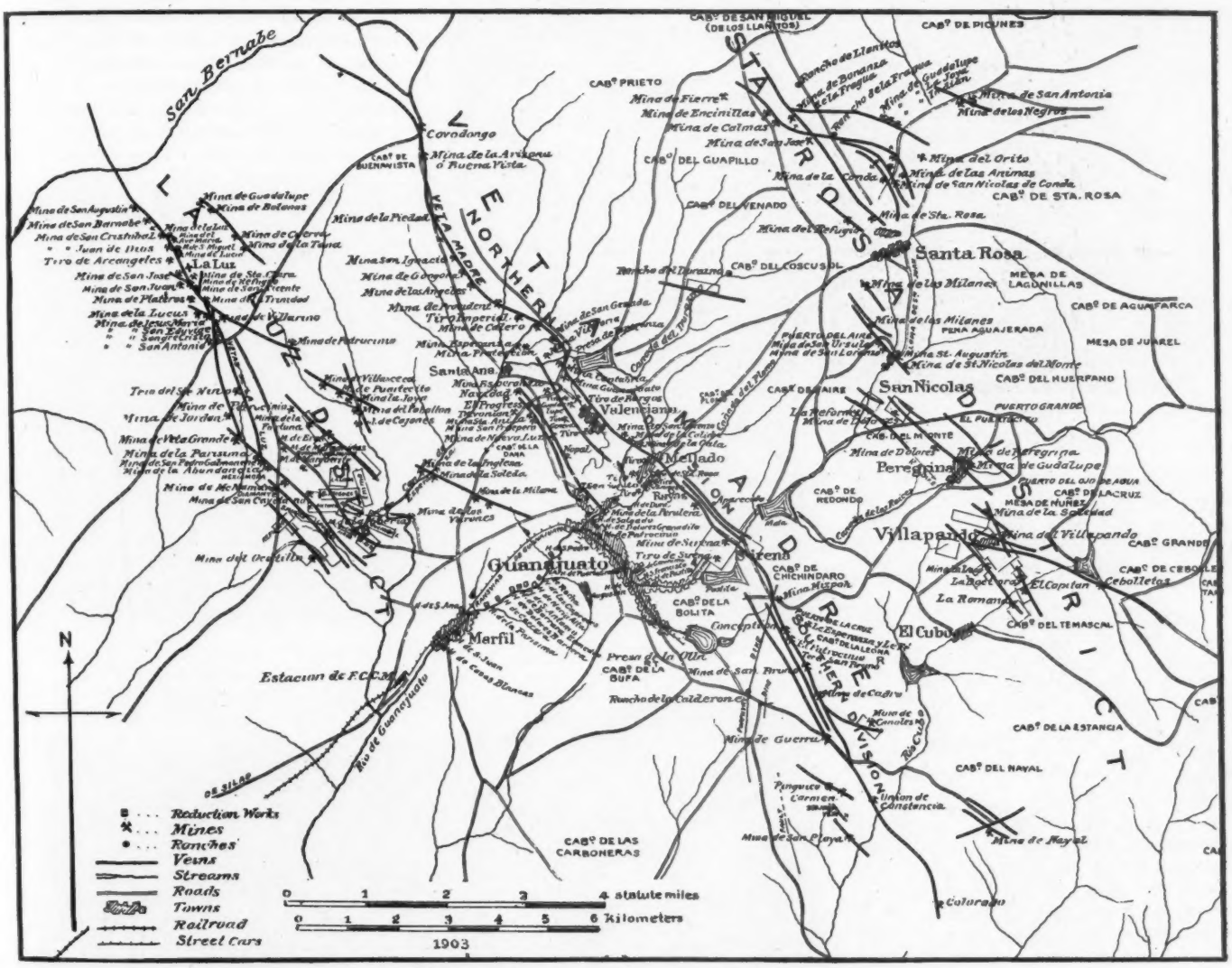
In their dress, food, and habits the natives are still the same type of Indian labor which the Spaniard found. The better classes are descendants of families which have made their fortunes by mining, and many of them to-day are proprietors of working mines.

Stretching along a narrow gulch for six miles from Marfil to Presa, this city is certainly one of the most unique municipal aggregations in the world; for here can be seen at a glance all the processes of mining and treatment inaugurated by the Spaniards in the 16th century, hardly disturbed by the violent contrast afforded by American installations designed only yesterday.

A bird's-eye view of the district can be obtained from the Hill of the Cross. Stretching northward for three miles along the *Veta Madre*, or Mother Lode, can be seen the oldest and largest group of mines. These are marked by buildings, dumps, hoists, chimneys, and churches—the accumulated monuments to human labor excelling in magnitude all other existing plants of old-time Mexico. Around each ancient shaft or opening there arises a quadrangle of medieval, battlemented and bastioned walls of great height and thickness, each of which is a masterpiece of constructive masonry. Overflowing these are great mounds of debris brought out from the mines on human backs during previous centuries and representing in the aggregate several million tons of rock. Projecting here and there above the mine buildings rise the marvelous lanterns, domes and belfries of the churches of Guanajuato, architectural structures erected in time past by fortunate mine-owners in commemoration of some lucky bonanza or in gratitude for a steady inflow of wealth.

But still more striking than these memorials of past activity are the great shafts sunk into the ground. Some of these, like the Tiro General of Valenciana, are 38 ft. in diameter, octagonal in shape, 1,700 ft. deep and lined for the first few hundred feet with a collar of solid masonry.

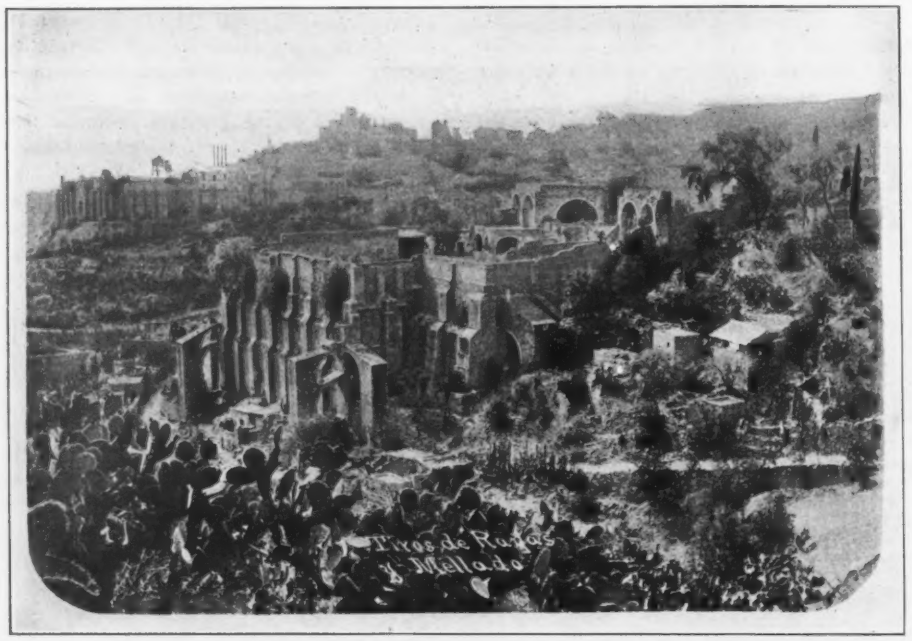
Following the southward extension of the Veta Madre from the Hill of the Cross, at the extreme eastern end of the city is La Sirena mine, the only one of the ancient properties which has fallen into modern hands, and possesses an active stamp-mill. Further south is



MAP OF MINING DISTRICTS AROUND GUANAJUATO, MEXICO.

[1]The writer wishes to extend his thanks to Messrs. George W. McElhiney and George W. Bryant for their courtesy, whereby it was made possible for him to make a thorough reconnaissance of this camp in October, 1903.

the Mina Cedro, which, after being pumped out, perpetuates the old hand-labor or burro-packing and arastra-milling process. Still further south are several old mines, like the Constantia, now abandoned, and the Carmen, which is the most profitable mine in the district. Twelve miles northwest may be seen



THE PICTURESQUE MINES OF THE VETA MADRE.

the spires of the church at La Luz, near the northern end of that belt—a parallel zone of veins a few miles west of the Veta Madre. Between these major belts many small plants and prospects mark the course of intermediate veins.

The vastness of the old mining operations holds the attention, but the observer cannot fail to notice, here and there, the modest intrusion of a modern American head-frame, and the wide distribution of poles and wires indicative of the installation of electric power. The whole district seems to be on the verge of a sudden transformation from sixteenth to twentieth century methods.

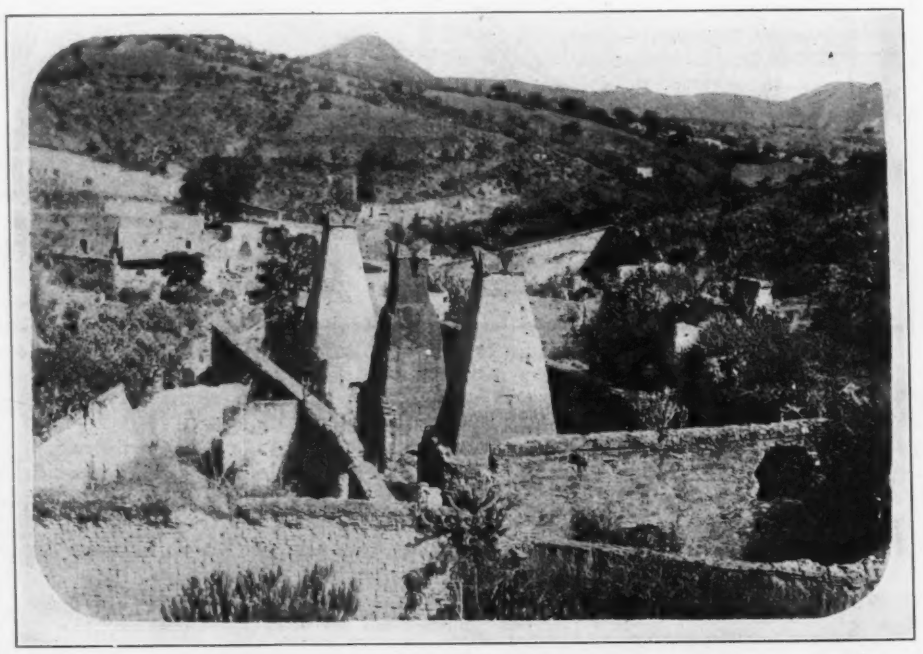
The mines of the district are all found in a quadrangular area about nine miles square surrounding the city on every side except the southern. See map. Within this area, there are over 124 mines and claims which have been worked in times past; many of them have been large producers and are extensively developed, but all except ten or twelve are now idle.

The Guanajuato mines are situated in an isolated group of mountains, which rise from the floor of the Mexican plateau near its narrow southern end, where the eastern and western Sierra Madre converge. In the central portion are found a few plications of sedimentary rocks, indicating that the range had its origin in folding; but this basal structure is so overwhelmed with igneous ejecta that the mountains may be considered piled up constructional forms, with dikes and volcanic necks, which have been much modified by erosion, uplift and faulting. In general, the Guanajuato mountains now present the aspect of an extensive irregular plateau, greatly dissected and rising abruptly above the desert plains of the east and west. This plateau rises in the east as a low sierra, which may be called the Sierra de Santa Rosa. In the extreme northwest is the Sierra Gigante, the newest feature of the landscape, consisting of an extinct volcanic pile, which through degradation has lost its crater shapes, but retains its conical profiles. To the west rises a similar peak called Cubilete. Between the sierras of Santa Rosa, Gigante and Cubilete, the eye catches a series of sub-uniform tops separated by deep cañons of erosion which testify to a plateau in process of dissection. The fan-like ramifications of the Guanajuato river concentrate on the plain to the southwest, and constitute the drainage system of the chief mineralized area.

The axis of the Guanajuato range strikes west of north (N. 30° to 45° W.); this is the direction which predominates on the Mexican plateau and may be termed the western continental trend. The most striking feature of this mountain area is the fact that, although undoubtedly the tops have been constantly degrading through erosion, the mass as a whole is rising to-day, and nowhere on earth is there a more beautiful illustration of uplifting lands. This is testified not only by the autogenous character of the rapidly incising drainage, but by a series of parallel faults with western downthrow, in which faulting is still progressing, accompanied by thermal, sulphide-precipitating springs to the west. To these processes the district owes the conditions favorable to mineralization.

The prevailing rocks consist of calcareous shales, called schists, and diorites, andesites, dacites, rhyolites, and vast deposits of bedded tuff. The so-called schists—the apparent basal rock—are exposed principally in a triangular area to the north of the town where they constitute the foot-wall country of the great fault known as the Veta Madre. The igneous rocks occur both as intrusions and as ejecta, and are widely distributed throughout the district; the former are dikes and stocks of old volcanoes; in some cases, laccolites. The oldest rocks are the metamorphosed shales. The diorites are probably the oldest igneous rocks and occur as dikes and masses in the north-central portion of the area. The western half is largely andesitic, while the eastern half is rhyolitic. Capping the massives almost everywhere are tuffs and agglomerates, except where scalped by erosion; these largely obscure the succession of geological events.

The oldest and perhaps largest of the bodies of ejected material is the red conglomerate (Guanajuato formation) which is found on the downthrow side of the Veta Madre in contact with the schists; it consists of a bedded agglomerate over 1,200 ft. thick, sometimes pebbly, sometimes angular, alternating with massive homogeneous beds having the texture of volcanic flows. Capping this is another great thickness of tuff which is more rhyolitic, and which, from the excess of chloritic coloring,



ANCIENT SMELTERS NEAR GUANAJUATO.

may be called the 'green tuff'; it undoubtedly represents several epochs of ejection. Still above this, probably a gradation from it, is a whiter tuff which may be called the *bufa* formation, while at one point, Chichindara Park, there is a cap-rock of rhyolite having a perlitic texture and showing flow-structure.

Cubilete and Gigante to the northwest are of more basic rock, probably basalt, and represent later eruptions. The vents of the red agglomerate and rhyolite eruptions have not been determined; the rhyolite in many places, especially the southeastern part of the district, is found protruding as necks and peaks; the andesite occurs, both with homogeneous and porphyritic structure, between dikes of this material extending from the southwestern quarter of the area in various directions, cutting the red conglomerates and the green tuffs, but it does not appear to penetrate the *bufa* cap-rock. The andesite—in masses and dikes—is apparently the latest eruptive rock within the mineralized area, and is the nearest agent in association with the mineralization of the district that can be at present assumed.

The major fault-system has a trend N. 40° W. This is dominated by the great rupture constituting the Veta Madre. This fault-zone schists; it is accompanied to the north by diorite intrusions and to the south by intrusions of andesite and rhyolite capped by tuffs. This fault-zone has a width of from 100 to 400 ft.; it is filled with quartz and calcite enclosing brecciated country rock, and the whole width is frequently an alteration of quartz veins and country rock. These veins, usually of tremendous size, are known as the hanging wall, the foot-wall and the middle veins.

The total length of the portion of the Veta Madre which has been worked is about seven miles, between the Esperanzas and the Cardones mines. Of this distance about one-third, at least, may be said to be still unexplored; the northern half is accredited with a production of $600,000,000, principally above the 1,000-ft. level. The extension south of Guanajuato has not been explored as thoroughly.

La Luz zone, which parallels the Veta Madre about four miles to the west, is neither as

WASHING TAILINGS FROM THE PATIO PROCESS, GUANAJUATO.

has a downthrow of over 1,200 ft. to the west and is accompanied by many accessory joints and minor faults. Parallel to this and successively southwestward are other faults, the largest and most conspicuous of which may be termed the *Veta La Luz,* while finally, at the foot of the western slope there is a line of present structural weakness from which breaks forth a series of hot springs (at Silao, at the foot of Cubilete and at the foot of Gigante); these are said to be depositing mineral sulphides. Complemental to this major axis of faulting there are numerous cross-fractures with an average trend of N. 60° W.

These faults and fractures of the Guanajuato mountains, by their mineralization, constitute the workable veins. In general, the district may be defined as the former site of volcanic activity, with intrusions through the sedimentaries at several epochs, and accompanied by great displacement. The veins, of which 57 are known and mapped, are fault and fissure-crevices, and occur for the most part along three great sub-parallel belts, the chief of which is the Veta Madre, in the center; the La Luz, to the west; and the Santa Rosa to the east. The Veta Madre is the great vein of the district; it is credited with a past production of $800,000,000; La Luz vein system, with a record of $350,000,000, is only second in importance.

The Veta Madre is a fault-zone in which the red agglomerates are downthrown over a thousand feet in contact with the calcareous long nor as wide, but in some respects it excels the main lode. It has been worked for a distance of about four miles by a series of old mines, many of which had their best development about the time of our civil war. La Luz covers 14 distinct veins, including La Joya laterals. Eight of these, constituting the La Luz group proper, are in parallel alignment and dip to the west. The remainder, constituting La Joya group, dip to the east. The major trend of the northern end of La Luz group is N. 15° W.; but the remaining veins have the N. 50° to 70° trend. The country rock is andesite tuff, schist and some diorite; the gangue is quartz, as in the Veta Madre, but the mineral contents run relatively higher in gold; in some instances the gold and silver are about equal in value. Along this vein there are several mines and much ground of great promise.

In addition to the Veta Madre and La Luz veins, with a prevalent northwest trend, there are many others of quite a different type and direction—in fact, as will be seen by the map, there is a large number of veins with trends of from N. 60° W. to N. 70° W., or in a direction diagonal to the strike of the Veta Madre. An instance of this may be cited in the Carmen, at present the most profitable mine in the district, which is off the Veta Madre and almost at right angles to it. The ore is a replacement in rhyolite.

(To be continued.)

MINING IN THE CROW'S NEST COAL-FIELD.

By James McEvoy.*

To one familiar with the methods of bituminous coal mining in an Eastern field, the successful management of a colliery in the West is not always an easy task. This is especially the case in the Rocky Mountain coal basins, where he finds himself face to face with conditions requiring considerable modification of his Eastern methods, if not an entirely different system of their own. The Eastern coals are practically all of Carboniferous age. A possible exception to this is in Virginia and Kentucky, where some of the coals may reach as high as the Triassic. The Western coals are chiefly of Cretaceous formation, and consequently are four geological ages younger than the Eastern ones. They have gone through all the same stages as the Eastern coals, but their development has been accomplished in one-half the time, owing to greater activity in the earth movements.

The Rocky Mountain region in most parts was the scene of tremendous movements, and great pressure is evidenced by the crushing, thrusting, folding, faulting and uplifting of the measures. The, comparatively speaking, newer rocks, such as the Cretaceous, sometimes suffered equally with the older ones of the region, and some large areas which, under quieter conditions, would have produced valuable coal-fields, were crushed and broken and eventually swept away by the denudation of succeeding ages. In other parts the movements were less violent, and where the pressure and heat were sufficient to produce the required degree of alteration of the coal without crushing the main portions of the basins, some of the highest grade bituminous coals were found in good workable form.

The greater the degree of alteration, the more moisture and volatile matter were driven off, and the higher the percentage of fixed carbon remained. Near the axis of the Rocky Mountains the conditions were most favorable for the development of good coal and the percentage of fixed carbon is generally between 65 and 78 per cent. Going eastward from the axis of the Rockies, the pressure gradually diminished and the fixed carbon is found to decrease, while there is a corresponding increase in moisture and volatile matter in the coals. Continuing eastward the coals soon become lignitic in character, and when the great plains are reached they are represented only by lignites proper.

The Crow's Nest field, situated just west of the main divide, suffered to some extent like the rest of the region. Its edges were turned up and a wider strip, now the Elk River Valley, was broken and carried away by erosion, but the main body of the field was lifted bodily up without any serious distortion. Generally speaking, the measures of the Crow's Nest field as they stand to-day, are bent upward all around the western edge of the field. The bending is almost universally gradual and regular, changing the altitude of the coal seams from horizontal to an extreme pitch of 40° in a distance of about three miles.

At three places on the western edge of the field, tributaries of the Elk River, which run partly or entirely across the field have cut out deep valleys, thus making the coal seams ac-

*Abstract of paper presented at the sixth annual meeting of the Canadian Mining Institute; Toronto, March, 1904.

cessible by level entries at places where the seams are more or less closely approaching the horizontal position. The highest seams in the main group of coal measures are exposed at points farthest up the valleys and, consequently, they are lying flatter than the lower ones where the latter are exposed by the same streams lower down and nearer to the edge of the basin.

At Morrissey, Fernie and Michel, situated respectively on the three transverse streams before mentioned, the Crow's Nest Pass Coal Company is carrying on active mining operations. At Coal Creek (the oldest of these collieries) the upper seams are lying in attitudes varying from horizontal to a dip of 15°. The lower seams on the same creek dip as high as 20°. At Morrissey the dips vary from 8° to 24°, and at Michel, they run from 15° to 35°.

It is evident that a system of mining and handling the coal in a flat seam will not apply to all these cases. Where the dips are moderate, the equipment is simple like that for a flat seam, horses drawing the cars from the working places to the main haulage roads. With the steeper dips, incline planes are used on which gravity does the work of lowering the cars to the main roads. Horses are then only employed on the secondary levels. Rooms are driven up the pitch from the levels and in each room there is a simple self-acting incline, which is operated by the miners themselves. Where the dip approaches 35°, chutes are used in the rooms and the coal is drawn from these into cars on the levels.

To obtain the greatest economy in handling the coal, the main haulage roads must be carefully laid out to take every advantage of the ground. Incline planes must be so located as to concentrate the work of lowering the cars. For this reason each incline is laid out so that it takes the cars from a set of rooms, 15 to 20 in number, on each side at every successive level.

The physical and chemical properties of the coal depend to some extent upon the amount of cover now overlying the seams, but are affected to a greater extent by the pressure which has been exerted by the bending of the measures and by the manner in which the strata have yielded to the bending movement.

Where the seams are lying flat, or nearly so, assays like the following one, made from a sample specimen of coal from the face of No. 2 mine, Coal Creek, are usual: Moisture, 0.41; volatile matter, 24.78; fixed carbon, 68.36; ash, 6.45; total, 100. The bodily tilting up of the seams when unaccompanied by bending does not materially affect the constituents. Where the measures are bent even slightly, if it continues for some distance to either side, there is a noticeable increase in fixed carbon and a corresponding decrease of volatile matter. The resulting coal is rather better in quality, having greater heating power.

As regards physical properties of the coal it appears that when the roof and floor have held the coal under intense pressure, during the bending movement, the coal remains firm. In some instances, however, this has not been the case and the roof and floor have apparently yielded readily to the induced lateral pressure, allowing the seam to thicken out. The result is, then, that a certain amount of shearing has taken place and the coal mines freely, producing a higher percentage of slack. This is an advantage rather than otherwise, where so much slack coal is needed for making coke, as it saves the cost of crushing lump coal.

FILTER-PRESSING IN WESTERN AUSTRALIA.

By W. A. Prichard.*

More than 70,000 tons of ore and over 15,000 tons of accumulated tailings are treated monthly at Kalgoorlie by filter-pressing. This constitutes over 80 per cent of the output. Outside of Kalgoorlie, many of the mines of Western Australia are passing from 25 to 50 per cent of their ore through filter-presses. It will be seen thus that this process plays an important part in the extraction of gold.

The Kalgoorlie lodes contain only a small percentage of quartz; in the process of milling, the ore produces a large percentage of clayey slime. The sulpho-telluride minerals must be reduced to slime before the gold can be dissolved by cyanide. It becomes necessary, therefore, to filter-press the whole product, except at a few mines where sufficient quartz can be separated by hydraulic classification to warrant cyaniding a part of the product by percolation.

Outside of Kalgoorlie most of the ores are subjected to stamp-milling and concentration. At some of these mines the slimes are too low in value to be handled profitably by filter-pressing, but in the majority of cases the slimes are either filter-pressed or stored for future treatment. Concentrates are treated in many cases, both in and outside of the telluride district, by fine-grinding and filter-pressing, both with and without preliminary roasting.

The employment of the filter-press for the treatment of gold-bearing slimes in Western Australia was suggested by its use in sugar-pressing in Queensland. The first experiments at Kalgoorlie were tried on the Hannan's Brownhill mine. The first filter-press plant was shortly afterward installed at the Lake View Consols mine in 1898.

The widespread introduction of the method was so sudden that the mechanical details of the presses now in use are not as perfect as would otherwise be warranted by the number of them at work. There is much room for improvement in the design of the machine; the future filter-press will be probably an automatic device for filling, pressing and emptying in one continuous operation. Many schemes have been suggested, but no practical machine has yet been installed on the field.

The filter-press in Western Australia has developed from a center-filling, hand-closing press making 1-in. cakes to a press filled on the side, closed by hydraulic pressure and making 3-in. cakes. It is used solely for the purpose of extracting gold solutions from pulp, which is too fine for leaching, and for drying gold precipitates from zinc-boxes.

The operation consists in forcing the slime-bearing solutions into the presses under sufficient pressure to drive the solution through cloths arranged on corrugated plates. The solution travels along the corrugations to an exit-cock on the plate, or to a channel along the lower side of the press, to which the plates are connected. The exit of solution from the liquid slime leaves a solid cake containing 15 to 25 per cent of moisture. Roasted slimes, owing to their porosity, retain a higher percentage of moisture than un-roasted—usually about 10 per cent. The gold solution, after filtering, is ordinarily pumped through clarifying presses to remove any fine slime that has passed through the cloths; it is then delivered to the precipitation boxes. These clarifying presses—usually some old discarded press—need but little attention, and generally require emptying but once in several days. After filling, the solid cakes of slime are first washed by pumping through them weak cyanide solution returned from the precipitation boxes. This water is passed to the precipitation boxes through the clarifier presses. The presses are next washed with the water required in the treatment plant for making up evaporation losses. After washing, compressed air at a pressure of from 50 to 80 lb. is blown through the presses to drive out as much of the water as possible. The presses are then opened and the dried slime is dropped directly into trucks, or belt-conveyors, and taken to the residue heaps.

The first filter-presses in use in the district were filled by means of montejus or vertical boiler-plate receivers. The method is as follows: The slimes are drawn off from the cyanide agitators into a sump and from there they gravitate into the montejus through a large pipe at the top. When the montejus have been filled with slime, the inlet pipe is closed by a valve. The slimes are then forced out by compressed air into the presses through an outlet pipe from the bottom of the montejus. The slimes, while in the sump and montejus, are kept from settling by jets of compressed air introduced at the bottom of each.

When presses are being filled by compressed air much air is lost by blowing through the presses. At each filling a monteju full of compressed air must be turned to waste after displacing the slimes before the operation can be repeated. The conversion of power to compressed air, the afore-mentioned losses, and the consumption of air used for agitation during filling of the montejus, cause the expense of filling presses in large plants by compressed air to exceed the cost of filling by pumps, by from 25 to 40 per cent. Where a very small tonnage is filter-pressed daily on mines where compressed air is available, it is sometimes considered preferable to fill with compressed air.

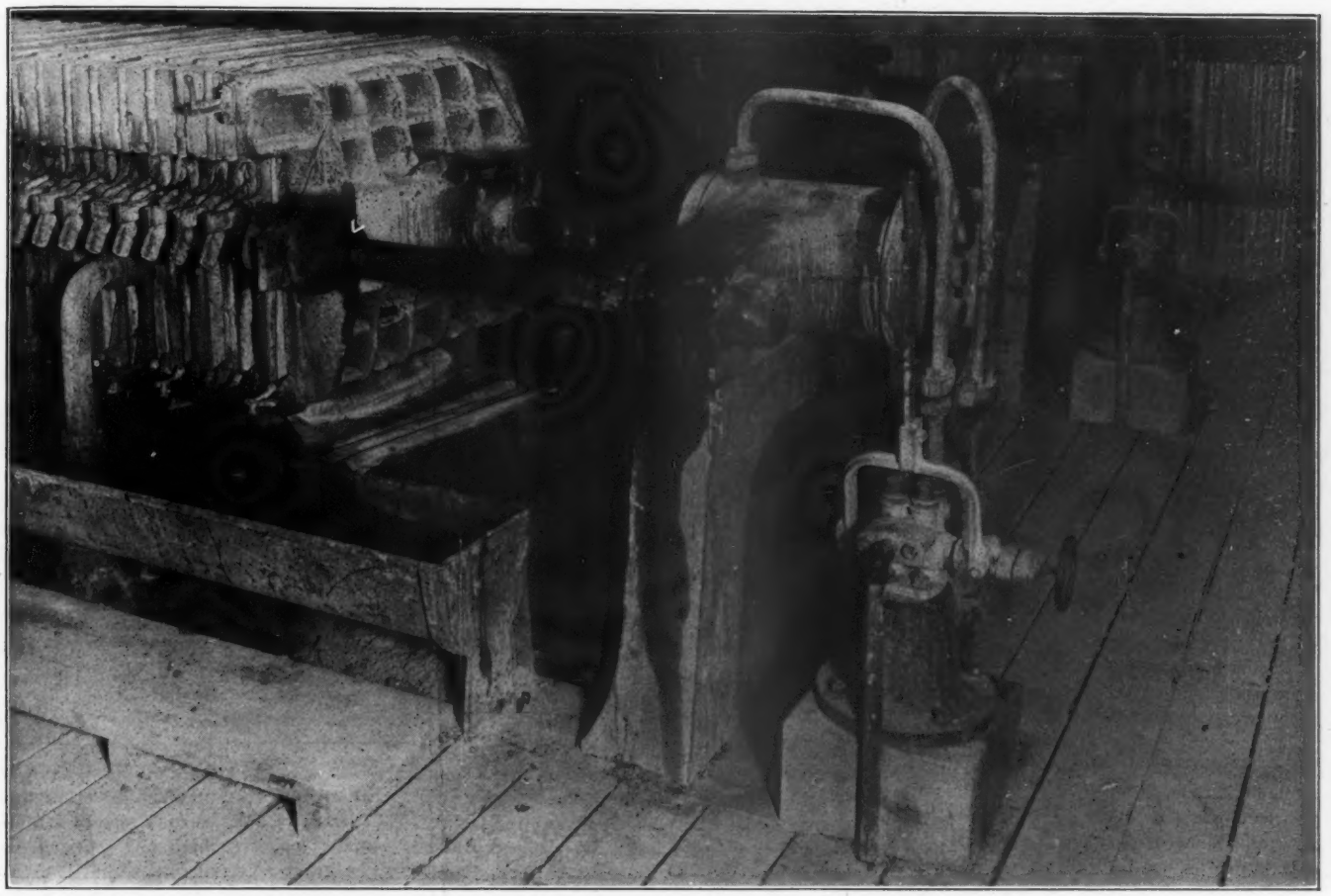
The large plants of Kalgoorlie have, with a few exceptions, discarded their montejus for belt-driven plunger pumps.

The presses in general use in Western Australia are of the Dehne type fitted with 50 rectangular frames with space for cakes of residue 3 in. thick. The capacity of these presses is approximately 5.5 tons (of 2,000 lb.), more or less, varying with the filling pressure and the porosity and specific gravity of the slimes.

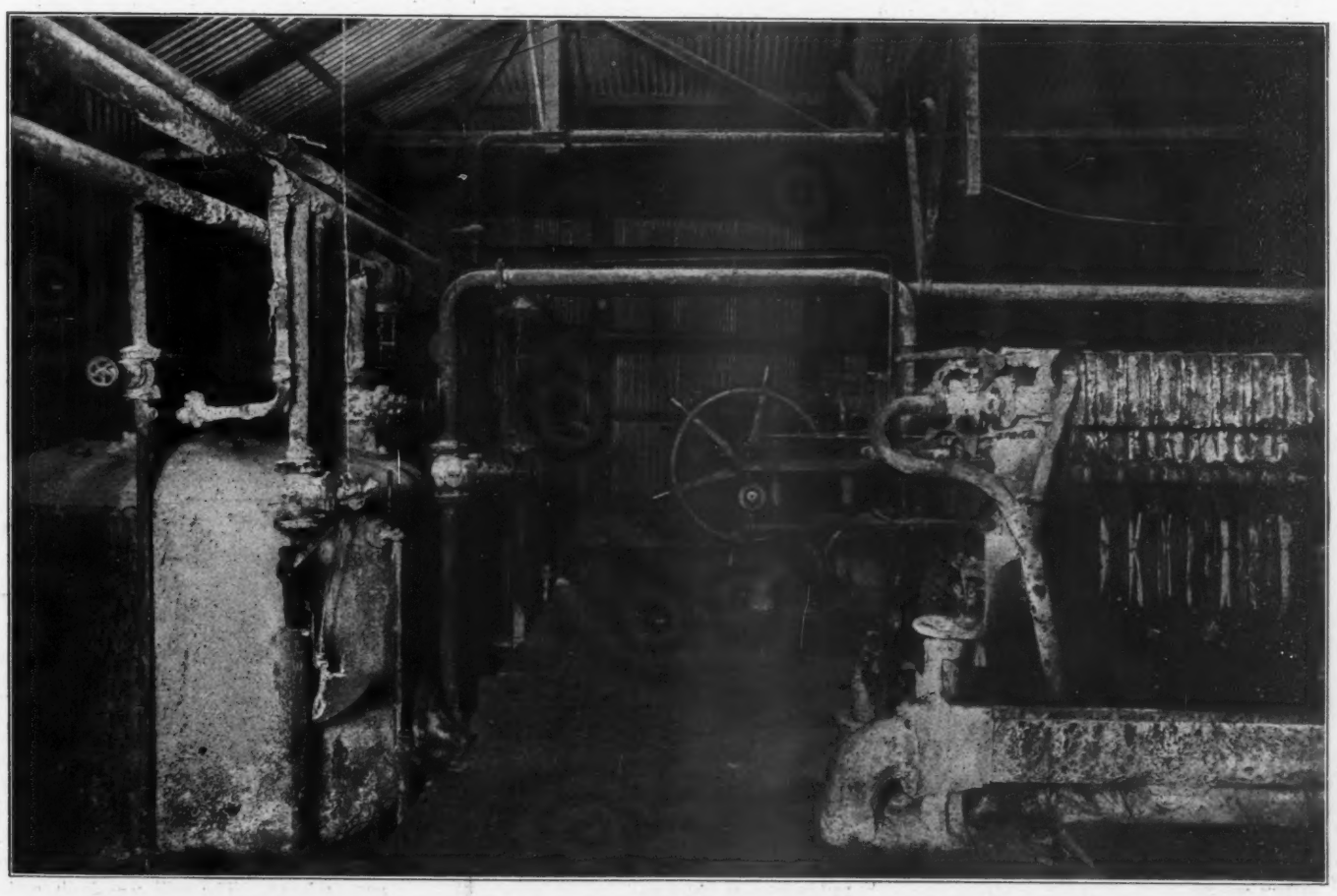
Roasted slimes filter more readily than un-roasted, and enable a thicker cake to be successfully washed, but as a 3-in. cake weighing about 220 lb. is about as much as two men can handle, no use has been made of this advantage—more particularly since roasted slimes foul the cloths more than raw slimes. Experimentally, a 12-in. cake was successfully produced and washed at the Great Boulder Main Reef mine. Six-in. cakes were unsuccessfully tried at the Lake View Consols and Oroya Brownhill mines, using the regular plates designed for 3-in. cakes. The failure of the cakes to properly fill the space was no doubt due to the smallness of the exit opening for the solution between the cloth and plate.

The cloth used for filtering is a cotton twill

*General manager of several of the largest mines in Western Australia.—Editor.



1. HYDRAULIC CLOSING FILTER PRESSES, 5½ TONS, OROYA-BROWNHILL MINE.



2. OLD PLANT, OROYA-BROWNHILL MINE—MONTEJUS AND HAND-CLOSING FILTER-PRESSES.

made specially for the purpose. This cloth goes by the name of "filter twill," and is the same as that called "saddle serge." For treating very clayey material the cloths are sometimes used double. At the Lake View Consols mine, Mr. Bigelow has discovered that a thickness of burlap (hessian) placed between the regular cloths and the plates facilitates filtering and increases the wear of the cloth by 50 per cent.

The presses used on the field are filled through a channel along one lower corner, with exit-cocks on the lower corner opposite the filling side. Machines are constructed by certain manufacturers with an exit channel inside the press instead of cocks and a drain along the outside. Each design has points in its favor.

When a cloth breaks on the press in general use, the location of the break is indicated by a muddiness of the solution which comes from the cock on the particular plate where the break occurred. With the inside channel exit, a broken cloth is indicated by muddy solution in the main channel, and the break can only be determined by examination of each cloth in the press, when the press is opened for cleaning; on the other hand, the cocks require renewals and cause a certain amount of extra labor, since each must be opened and closed with every pressing.

The newest and most improved filter-press plant in the district is that at the Oroya Brownhill mine. Four new hydraulic-closing presses, built by Martin & Company, South Australia, have been installed and the old hand-closing presses are being fitted with hydraulic rams. The specifications of this plant when complete will be as follows:

One sump with agitating gear to hold slimes in suspension after leaving the agitators prior to filling presses.

Six presses each containing fifty 3-inch frames, aggregating a capacity of 5½ tons of dried slimes, fitted with 10-in. hydraulic rams on one end for enclosing presses to resist 100 lb. per sq. in. filling pressure over the area of the cakes, or a total of 77 tons.

Two old 4-ton presses, for clarifying solutions.

One vertical triplex single-acting belt-driven 9 in. by 18 in. stroke plunger pump for filling. This pump with 28 rev. per min. will fill two presses in 20 minutes to 60 lb. per sq. in. pressure, displacing 61,000 lb. of slime resulting in 22,000 lb. of dry residue and 39,000 lb. of water.

One duplex horizontal double-acting belt-driven 7 in. by 10 in. stroke plunger pump for washing. This pump will work against a pressure of 100 lb. per sq. in., but is only required to work at about 20 lb. less than the filling pressure. The pump is geared to 42 rev. per minute.

One clarifying pump of same dimensions as washing pump.

One treble hydraulic pump and accumulator to work to 2,000 lb. per sq. in.

Belt-conveyors for disposal of residues.

The operations of this plant are as follows:

Average time for filling presses	15.5 minutes.
Average time for washing presses	15 "
Average time for emptying, cleaning and closing	37.2 "
Maximum filling pressure	70 lb. per sq. in.
Maximum washing pressure	54 " " "
Maximum drying pressure	56 " " "

The labor required to operate six presses is seven men on each shift, consisting of one tap-man, who looks after the pumps, taps and solutions, and two cleaners for every two presses. The cleaners work in pairs and clean one press while another is filling, washing and drying. Two men can comfortably close and empty 12 hydraulic presses in an eight-hour shift or a net working time of 7.5 hours. The usual work for a pair of men with hand-closing presses is eight or nine presses per shift.

The cost of filter pressing varies greatly on the different mines on account of the different tonnages, efficiency of power plants, labor conditions, design of presses, and varying practice. The rate of wages paid and the tonnage handled per man on adjoining mines often differs widely.

The new plant of the Oroya-Brownhill mine is not completed, hence the costs cannot be given. The costs of two of the Kalgoorlie mines for the month of November, 1903, for filter-pressing with hand-closing presses were as follows:

	Lake View Consols. 7,959 short tons.	Great Boulder Main Reef. 2,276 short tons.
Labor and salaries	$0.1848	$0.1730
Power	.0988	.1180
Repairs and Maintenance	.0756	.0241
Assaying	.0174	.0102
Sundry Supplies	.0182	.0400
	$0.3948	$0.3653

It will be seen from this that, in spite of unfavorable conditions for power, water and labor, the cost is not high. The use of the filter-press is, moreover, to be commended on account of the minimum waste of water and the easy delivery of residues onto belt-conveyors.

The aeration of slimes by compressed air during the drying process in the presence of cyanide no doubt increases the gold extraction. It is sometimes practicable even to do away with preliminary cyanide agitation and simply use cyanide solutions for milling, and then filter-press the slimes direct from the battery. In such cases the montejus are preferable to pumps on account of the extra agitation and aeration caused by the compressed air.

I have lately caused a number of tests to be made on filter-press cakes to determine whether any part of the cake was not sufficiently washed or whether concentration takes place during the filling. Samples were taken in various parts of the cake at several mills. It was found that in no part of the cake more than another could gold be extracted from the sample by further washing. A concentration of values at the bottom of the cakes was detected where the slime was comparatively coarse or where concentration prior to cyaniding was not complete, but where 98 per cent of the slime passed through 150-mesh wire sieve the results were uniform throughout. The samples taken from any part of the cakes are representative on such slimes, but in the cases where slimes are comparatively coarse, or contain gold-bearing sulphides, great care must be taken to get a representative sample.

No practical difficulty has been found in treating slimes containing as high as 25 per cent of sand remaining on a 150-wire mesh sieve.

Gold precipitates from zinc-boxes are filter-pressed throughout the State in miniature plants, patterned after the large monteju filter-press plants described above.

FIRES IN THE BAKU OIL-FIELDS.—The wasteful conditions prevailing in the Baku oil-fields may be understood from a table of fire losses compiled by the technical committee for the preservation of the fields. Beginning with 1897 and up to September, 1903, there were 137 fires, which destroyed 1,308 derricks, the total damage amounting to 9,988,505 rubles, or $5,144,080.

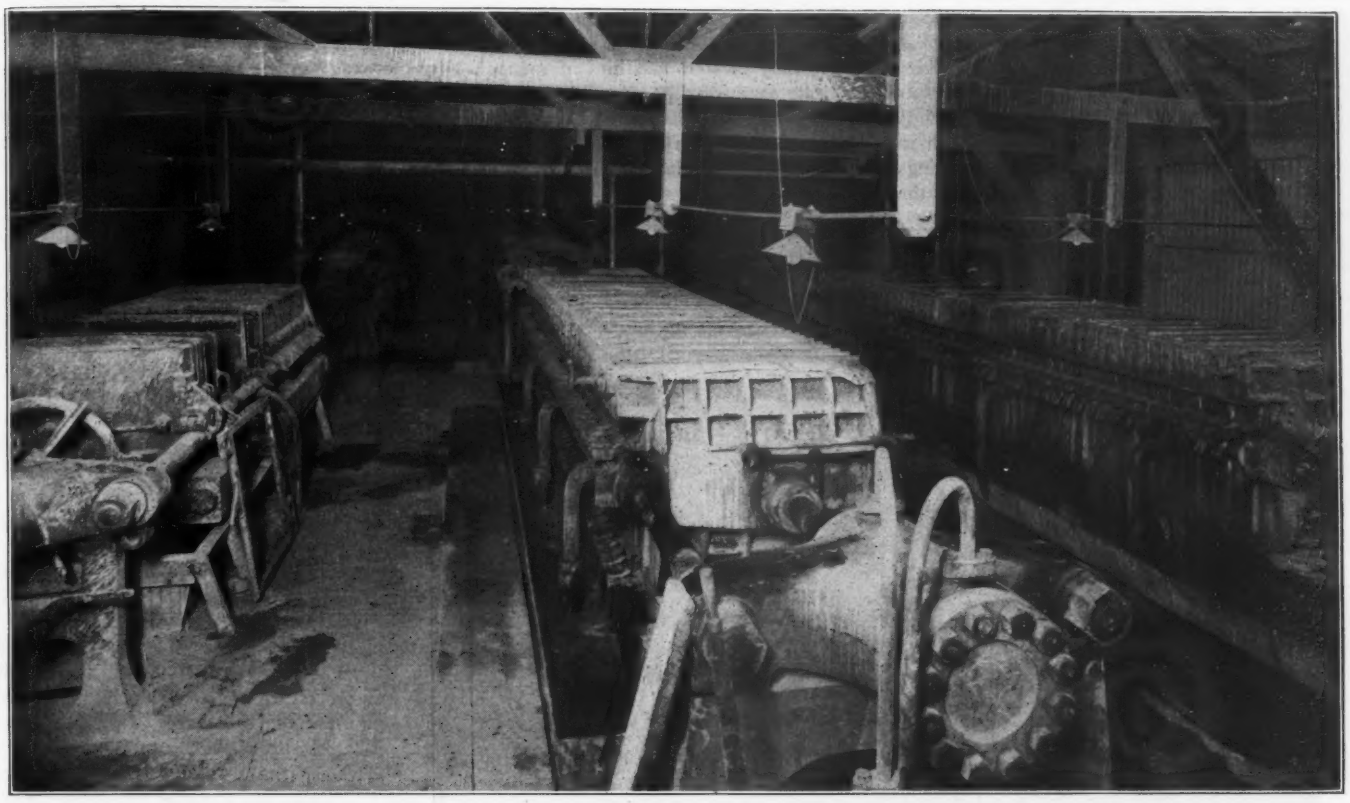
PETROLEUM IN BORNEO.—According to A. Gurgenianz, former manager of the Shell Transport & Trading Company's refinery in Borneo, who recently visited Beaumont, Texas, the oil-fields of Borneo are of great promise. Development has been in progress five years and now there are from 50 to 60 wells in the northeast part of the island with a total daily production of 600 tons.

MILLING IN UTAH.

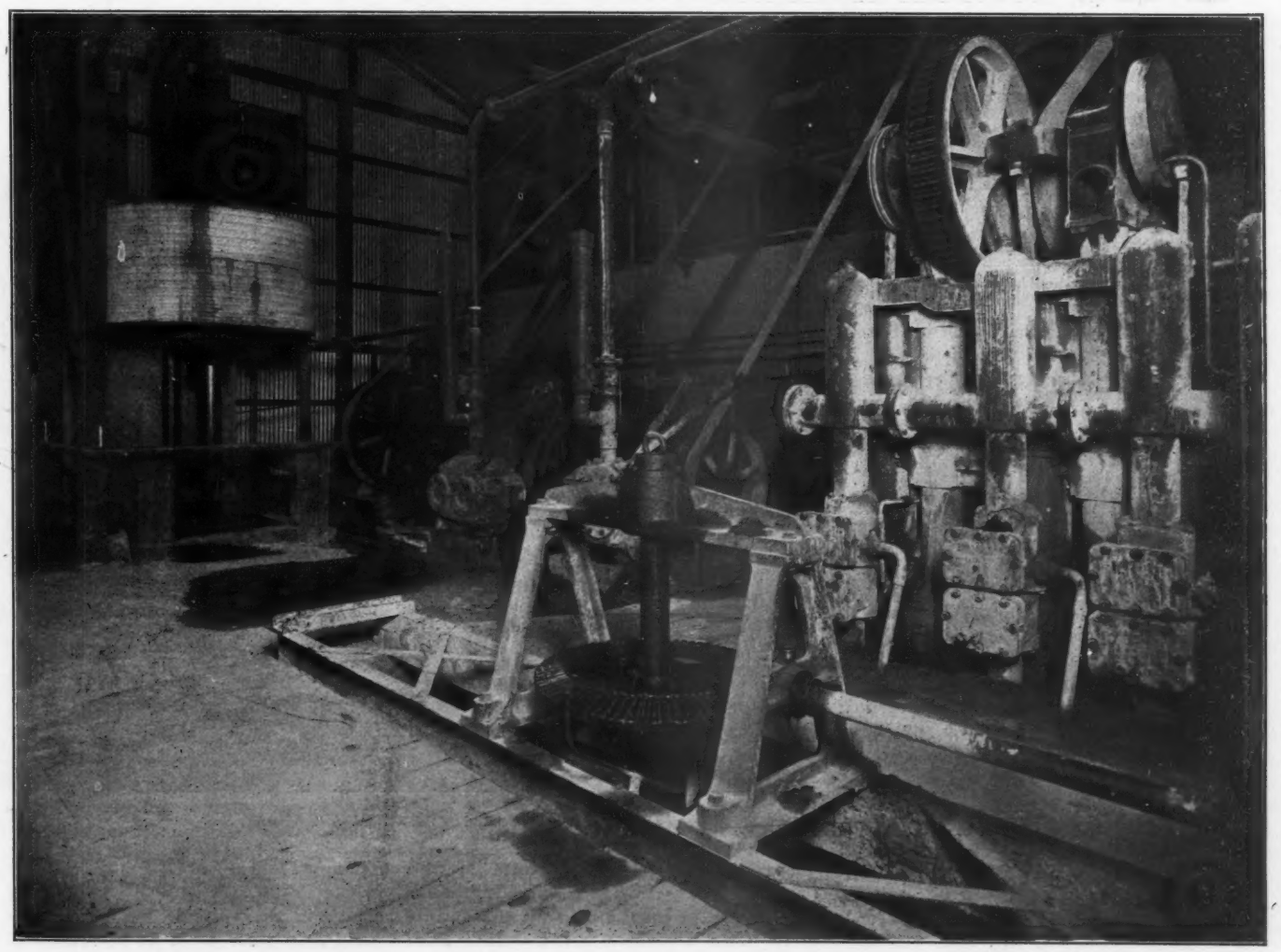
The following notes from our correspondent will be of interest at this time. They deal with two mills at Park City, Utah:

The mill at the Silver King mine handles from 125 to 160 tons of ore per 24 hours. The ore, after passing through crusher, rolls and screens, is jigged, so as to yield five sizes. The jig product carries 48 to 50 per cent lead, 60 to 70 oz. silver per ton, together with $3 to $4 gold, and this constitutes approximately 75 per cent of the total recovery. The jig tailings are re-ground in Huntington mills having 20-mesh screens, the product going thence to a system of classifiers which size it for the tables and vanners. On the concentrating floor are 12 Wilfley tables, five Frue-vanners and four Wilfley slimers. The finest material from the classifiers goes to the vanners, the coarse to the tables. The tailings from both tables and vanners pass to elevators, thence to screens, and the undersize from the latter goes to the Wilfley slimers, the oversize being re-concentrated by the tables. The table middlings are likewise re-treated on other tables, and the table slimes are re-classified. The slimers make a product that runs 17.7 per cent lead, 28 oz. silver and $2 gold; the table product approximates 24 per cent lead, 24 to 30 oz. silver, and $3 gold per ton; the Frue vanner concentrates will run 18 per cent lead, 26 oz. silver, and $2 gold. The muddy water, or slime, from jigs, screens and other sources is collected in a series of V-shaped settlers, each 40 ft. long, 5 ft. high and 5 ft. wide at top. The heavy material settles, and is then drawn off at the bottom through taps into launders that discharge into the boots of elevators, the latter conveying the pulp or mud to an iron stock-tank. From here it is discharged into two steel receiving tanks, holding 2,500 gal. each, wherein the material is subjected to the action of compressed air, forcing it into filter-presses, by which the principal proportion of the water is squeezed out, leaving the pulp in compressed, circular slabs, carrying from 11 to 12 per cent lead, 18 oz. to 20 oz. silver and $2 to $3 gold. These filter-press slabs, amounting to 12 tons per day, are chopped up by a specially contrived device, and passed through a drier, which reduces the moisture in them to about 12 per cent. It is found inadvisable to reduce the moisture lower than this on account of the fineness of the particles; there would be loss in handling if they became very dry. The concentrates from the tables, vanners and slimers are dried in the same manner, but the moisture in them is reduced to 3 per cent. The concentrates referred to, and the slime product recovered in the filter-presses, are shipped separately to the smelters. The mill effects a total concentration of about three tons into one ton. This is the only mill in this district employing filter-presses in the treatment of slime. The Wilfley slimer is in use at several mills in the district. It does the work of the canvas strake, with the additional advantage of its lateral motion and its slow longitudinal travel, whereby a washed surface is constantly being presented for the slimes to pass over. Mr. M. J. Daly, Park City, is general manager of both mine and mill, with Mr. J. W. Stevens as mill superintendent.

While the Keith-Kearns mine is under the management of Mr. M. J. Daly, of the Silver King, the mill is in direct charge of Mr. J. T. Kescel, who states that he is milling 100 tons per 24 hours. The mill was built under the



3. HYDRAULIC PRESSES AND OLD HAND-CLOSING FILTER-PRESS FOR CLARIFYING, OROYA-BROWNHILL MINE.



4. AGITATING SUMP; FILLING WASHING AND ACCUMULATOR PUMPS; AND HYDRAULIC ACCUMULATOR FOR FILTER-PRESSING, OROYA-BROWNHILL.

directions of Mr. E. L. Kimball, after designs by Mr. J. W. Stevens. It is strictly a concentrating plant, making use of crusher, rolls, jigs, Huntingtons, hydraulic classifiers, Wilfley tables and slimers. The jig product amounts to about 65 per cent of the entire mill saving. Five table sizes are made, which are high in lead and rather low in silver. The middlings are re-concentrated, and the overflow from the classifiers passes to the slimers, where a product is made that runs 50 per cent lead and 25 oz. silver per ton.

A BAUXITE OPENING IN ARKANSAS.

At the Ontario, a new mill has been built on the foundations of the old mill. It is provided with crusher, two sets of rolls, Huntingtons, classifiers, and concentrating tables, all operated by electric power. The ore comes largely from the workings below the 1,500-ft. level, comprising iron-lead-zinc sulphides, with silver and gold and a small amount of copper. It is a concentrating ore, and is best adapted to jig work. The general idea of the mill is to crush and pass the ore through roughing rolls; it is then screened, the oversize going to the finishing rolls and the undersize to the jigs. The product of the second crushing also passes to the jigs. The jig tailings are reground by Huntingtons, passing thence to classifiers. The first two sizes from classifiers are also jigged, the finer sizes from settlers and the last jig-tailings go to the tables. The jig concentrates will run 52 per cent lead, 76 oz. silver per ton, 7 per cent zinc, and 10 iron.

The manager, Mr. C. L. Rood, of Salt Lake City, states that the 1,700-ft. level in the mine is opened the full length of the property. By means of raises, blind levels have been opened above the 17th. From the 2,000-ft. station a crosscut was driven 360 ft. from the shaft to the ore, which has been followed by drifts each way from the point of intersection. Four Knowles duplex pumps are in position, two each at the 1,700 and 2,000-ft stations. The water, amounting to 1,000 gal. per min., is raised to the great 20,000-ft. drainage adit at the 1,500-ft. level. Mr. Moffet is superintendent of the property, with Mr. Matt Connolly as mine foreman and Mr. C. Brusnahan as mill foreman.

BAUXITE IN ARKANSAS.

By W. F. B. Berger.

Bauxite, the hydrous oxide of aluminum, is found only in four localities in such quantity as to be commercially valuable; near Baux, in France, whence its name; in Ireland, in Georgia, and in Arkansas. It is found also in small quantities in New Mexico, and in the Yellowstone Park.

Prior to 1890, most of the bauxite used in the United States was imported from France, but now the imported ore forms a small percentage of the tonnage consumed in this country. It is a common supposition that the principal use of bauxite is in the manufacture of the metal aluminum, but, in reality, more than half the amount used in the United States is put to other purposes. Over 20,000 tons are used each year in the manufacture of alum by the various chemical companies throughout the East; over 5,000 tons per annum are shipped from Arkansas to Niagara Falls, where a company is making artificial corundum. The Pittsburg Reduction Company, which until recently obtained its supply from France, is now utilizing the bauxite from Arkansas.

At present the uses of the mineral are limited to the three industries just mentioned, but a fourth promises to become prominent. In Europe the refractory qualities of bauxite have been recognized for many years, but, so far, the use of American bauxite for this purpose has been limited to experiments. It is especially adapted for lining furnaces where a basic flux is needed; the cheapness of bauxite, and the superior qualities of the refractory materials made from it, should soon enable it to replace magnesite and other refractory substances.

The American production is generally credited to Floyd and Walker counties, Georgia, and Cherokee county, Alabama, but, as a matter of fact, the production of bauxite in Arkansas last year was nearly double that of the Georgia-Alabama districts. This result is due mainly to the greater diversity of analysis exhibited by the Arkansas product, rendering it suitable for many uses, whereas the Georgia ores are chiefly adaptable to the alum trade.

The bauxite of this country, both in Georgia and in Arkansas, is superior to the European ore for the manufacture of alum, though a glance at the comparative analysis would lead one to think otherwise. Typical analysis of alum bauxite are given herewith:

	Arkansas per cent.	Georgia per cent.	France per cent.
Al_2O_3	61.00	60.43	72.
Fl_2O_3	2.25	1.32	..
TiO_2	2.50	1.25	28.
LiO_2	5.30	6.02	..
H_2O	29.03	....	..

Though the French bauxite contains over 70 per cent Al_2O_3, and the best Georgia alum ore only about 60 per cent, when both are submitted to the customary 50° B. sulphuric acid attack in alum making, the French ore will yield only from 50 to 55 per cent available Al_2O_3, whereas 57 per cent Al_2O_3 is obtained from the Georgia bauxite. The explanation of

BAUXITE MINING IN ARKANSAS.

this is that the impurities in the European ore are chemically united with the Al_2O_3, while in the American bauxite the chief impurity, silica, is a physical dilutant. Though the Georgia ore cannot compete in the manufacture of aluminum with the red bauxites of France, there is a red variety found in Arkansas which is superior to the French, as it contains less silica, the worst impurity in aluminum reduction.

The attention of the public was first called to the Arkansas deposits in 1891, when they were described by the State Geologist, Mr. J. C. Branner, now professor at Stanford University, but it was not until 1895 that their commercial value was recognized. In that year two of the three large bauxite companies then operating in Georgia made investigations in Pulaski and Saline counties, and they now practically control all the important deposits. Both companies established mills and drying plants at the town of Bauxite, about 22 miles south of Little Rock.

It is not my purpose to enter into a dissertation on the geological origin of the Arkansas bauxites. This subject has been ably treated by Mr. C. W. Hayes, in the 21st Annual Report of the United States Geological Survey in 1900, also by Professor Branner in a report made in 1897. Later developments have afforded some new features, which would warrant a supplementary report by the officers of the Survey.

The deposits are directly associated with the eleolite syenite, which occurs in Pulaski and Saline counties. This formation appears as a continuous chain of low ridges, trending northeast for 20 miles, with an outcrop scarcely a mile wide. Through the action of alkaline waters on this syenite, while still hot, the bauxite was produced in two varieties. One variety has the same structure as the syenite, and is practically a pseudomorph after it and in place. The feldspar and biotite were dissolved out, and the eleolite crystals, retaining their form, were changed to crystals of gibbsite. This granitic variety of ore overlies the syenite in beds averaging 15 ft. thick, covered with a thin stratum of soil. The lower part of the bed gradates imperceptibly into the syenite from which it was formed. The other variety is oölitic in structure, and was formed in a different manner. The alumina of the feldspar and of the eleolite in the syenite was completely dissolved, and precipitated as a hydrate in extensive beds of ore averaging 20 ft. thick. These extend outward from the syenite ridge to a distance of about one mile on both sides, and become thinner as the distance increases. Since these geological events brought about the formation of the bauxite, atmospheric agencies have done their work. The action of water on the syenite, and on the partly formed bauxite, has produced a deposit of an impure kaolin, locally called 'chimney rock.' This is regularly quarried by the farmers, and makes an excellent material for fire-places. This kaolin always underlies the ore on the edges of the deposit, and forms extensive beds, 6 to 30 ft. thick, which extend along both sides of the syenite ridges.

In the true sense of the word, the mineral bauxite, as described by Dana, namely, Al_2O_3, $2H_2O$, does not exist in Arkansas. All the analyses show that it is a tri-hydrate of alumina, Al_2O_3, $3H_2O$, called gibbsite. However, since this ore has gone commercially under the name of bauxite, it will undoubtedly retain that name, instead of the scientific term, gibbsite.

Owing to the fact that the bauxite lies in beds separated from the surface by less than five feet of soil, the process of mining is exceedingly simple. The mines are on gently sloping hillsides, where a face of ore is most readily obtained. It will not be necessary for years to come to open up the deposits that lie in the lowlands, where drainage is difficult. The first step in the process of mining is to establish a floor and develop a face of ore. The soil is then stripped for a number of feet, and heavy charges of blasting powder are put in drill-holes 15 ft. deep, and the face is thereby loosened and broken down. The ore is then readily moved with pick and shovel into wagons that are driven into the open-cuts; tram-tracks are laid down and shifted against the face as the work proceeds. The presence of iron 'ribbons,' and other iron segregations throughout the ore, necessitates a preliminary sorting. This is most readily done at the face, the waste being thrown back into old workings. Thus far no mechanical methods have been adopted, but undoubtedly hand-labor will be soon largely discarded.

The preparation of ore for the market is also simple. If intended for the alum industry, it is merely crushed and dried and loaded in bulk on box-cars. Drying is accomplished in cylindrical dryers of about the same type as those used in preparing phosphate. When a low-silica ore is required, such as is necessary for the manufacture of artificial corundum, the bauxite, after being crushed, is run through an old-fashioned log-washer. This operation removes all the silica, except that in the form of the insoluble aluminum silicate, halloysite, which is usually present in such small proportion as to be negligible.

The future of the bauxite industry in Arkansas is promising. The constantly increasing production of aluminum is the chief stimulant; the demand for artificial abrasives is also becoming more pronounced; the consumption of alum by paper manufacturers and by water-works is greater every year. As a conservative estimate, it may be said that for the next few years the output of bauxite will increase 20 per cent per annum.

THE ASPHALT DEPOSITS OF SAN VALENTINO, ITALY.*

The asphalt deposits of San Valentino are situated in the province of Chieti, about 30 km. from the harbor of Pescara, on the Adriatic sea. The surrounding country is mountainous, the elevations forming the northeastern spur of the Abruzzi range, and is composed of Tertiary strata, principally conglomerate, clay, marl and limestone. The asphalt occurs as an impregnation of the limestone within certain zones, which have a superficial area of 50 square kilometers. As a rule, the deposits are found near the surface, and are concordant in dip and strike with the inclosing strata. The thickness of the impregnated zones range from 10 to 40 m., averaging 30 m. Developments up to the present time have shown the existence of an enormous store of material, sufficient to indicate that it is one of the largest accumulations of asphalt rock known in any country. As the product is of high quality, it would seem that the deposits are destined to have great commercial importance.

*Abstracted from an article in the *Oesterreichische Zeitschrift für Berg- u. Hüttenwesen*, December 26, 1903.

Work is now being carried on at three different horizons in the limestone, of which the first horizon is represented by the mines of Santo Spirito, the second by those of Acquafredda and Fonticelli, and the third by the mines of San Giorgio, Cusano and Piano del Monaci. The rock from the different horizons varies somewhat in character, and is employed for different purposes.

The Santo Spirito mines lie in a small valley, about 1,200 m. above the sea. The deposit is from 10 to 12 m. thick, and is worked through adits, the material being packed by mules to the tramway, 16 km. distant. The rock contains 10 per cent bitumen, and is marketed in ground form.

The Acqua-fredda mines, situated 800 m. above the sea, yield a porous, crystalline calcite, containing 12 per cent bitumen. They cover a large area, and are worked by both open cuts and adits. The deposit ranges up to 50 m. in thickness. All of the product is treated in iron retorts for recovery of the bitumen, which is of excellent quality.

The San Giorgio mines, which are operated on the largest scale at present, are connected by a tramway 6 km. long with the works at San Valentino. The deposit has a thickness of from 30 to 40 m., and has been proved over an area of 50 acres. It is worked as an open cut and by a shaft which reaches a depth of 150 m. On the average, the rock carries 16 per cent bitumen.

The Susano, Piano dei Monaci and Fonticelli mines are of the same general character as those just described. They yield a rock that contains about 10 per cent bitumen.

At the works in San Valentino there are two large mills, each capable of turning out 4 tons of ground asphalt per hour. The kettles for melting bitumen, of which there are six, have a capacity of 80 tons per day. The refining department is supplied with six kettles and three retorts, each of 4 tons capacity and produces from 50 to 120 tons of refined bitumen and goudron a month. Power is supplied by an electric generating station on the river Lavigo, about two miles distant. The output of the works, including ground asphalt, mastic, asphalt blocks, bitumen, goudron, etc., in 1902, was about 11,000 metric tons.

ASPHALT MINES IN COLOMBIA.—Near Chaparral, Tolima, the Home Land & Mining Company, of New York, is working an asphalt mine and shipping annually about 2,000 tons, equally divided between the United States and Germany. The asphalt is hard, contains from 99.45 to 99.65 per cent bitumen, and is well adapted to the manufacture of paint and varnish. Ordinarily it is shipped in sacks, and sells, f. o. b. New York, at $65 per short ton, which, by the way, is considerably more than the quotation on Trinidad asphalt. The ocean freight on Colombia asphalt, about $5 per ton, is also higher than that on Trinidad. The Chaparral mines are about 1,000 meters from the Saldaña river, which has an outlet into the Magdalena a few miles above Girardot. Rafts are used to transport the asphalt down to Honda, and steamers carry it to the coast for export. The asphalt deposits have only recently been discovered, and are owned entirely by the New York company.

From 100 tons of asbestos mineral mined in Canada the yield is 1.5 tons crude asbestos, and 5 to 8 tons fiber and paper stock.

THE SIROCCO FAN.

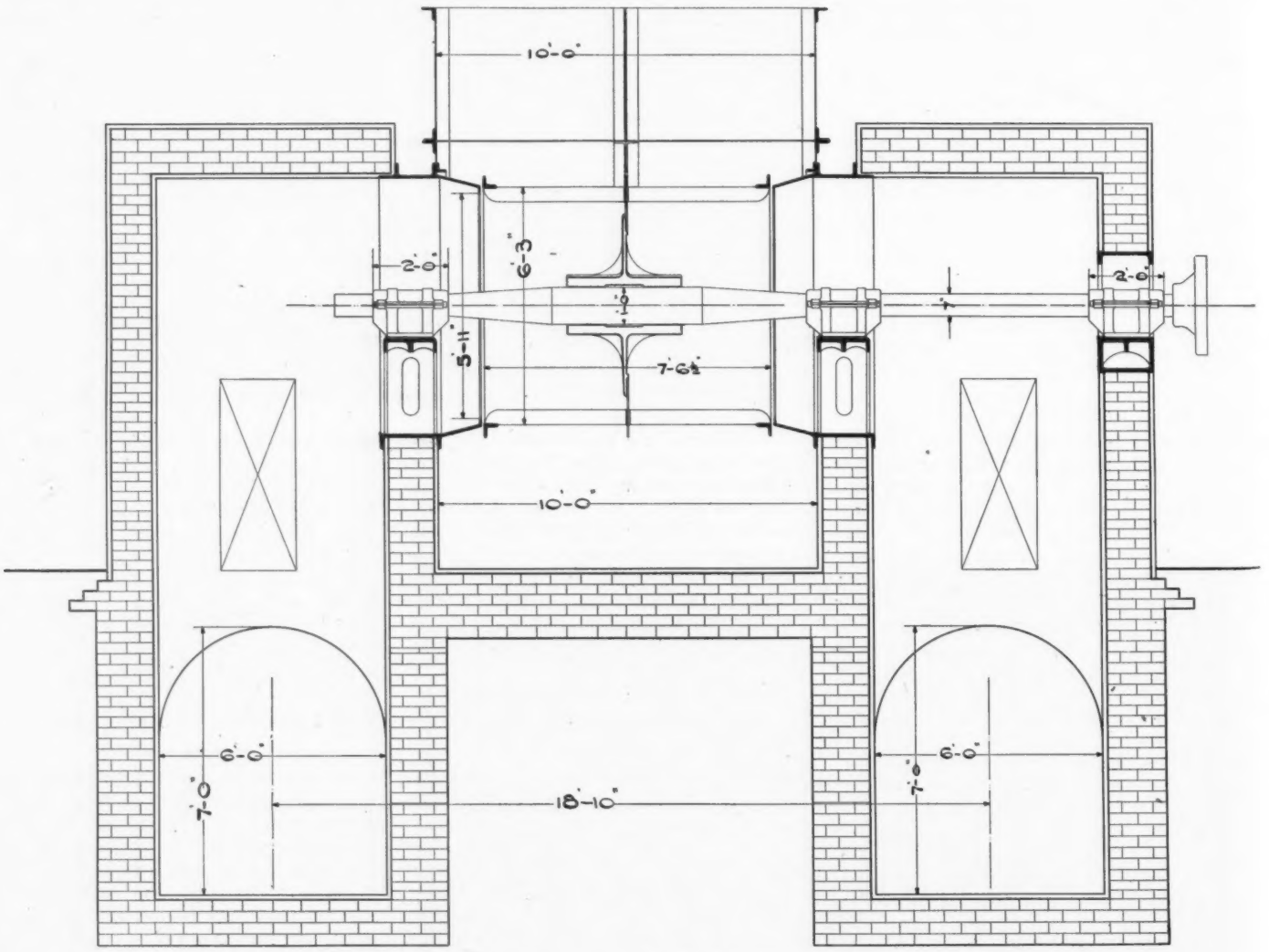
There has been far too little experimental work in mine fan design since Guibal's death over 20 years ago. In the United States particularly, little has been done. Hence we see at Pennsylvania anthracite mines Guibal fans 35 ft. in diameter that are of faulty design, even on the basis of accepted theory, yet were built simply because fans of similar pattern had been used before. Carefully conducted comparative tests of the mechanical efficiency of fans are seldom made, yet it is by trial and error that advance must come, since mathematical theory has been a poor guide in fan design. Air, in fact, has a way of doing as it pleases.

The Guibal fan is still handling large volumes of air at collieries all over the world. Conservative colliery managers cling to it, and such matters as comparative costs, including first cost, power, etc., are too little regarded, while the matter of comparative efficiency is ignored. Small, quick moving fans, however, are now extensively used at Continental collieries, are being adopted in this country and are even advocated in the anthracite region for certain mine conditions there.

The plan of most centrifugal fans is to set the air in motion gradually and provide the easiest path from the center to the periphery. In the centrifugal pump, where the fluid to be set in motion is heavy and the inertia considerable, this idea may be correct, but in dealing with so light a fluid as air, of which over 13 cubic ft. weigh a pound, it is a simple matter to impart high velocity in a very short space of time.

A fan that has been tested under severe conditions with satisfactory results by the British Admiralty and other exacting users, is called the "Sirocco." It has been used for forced and induced draft, ventilating buildings, etc. Its distinguishing characteristics are the shape and number of the blades.

The blades, as shown in the diagram, of a 35-in. fan, are scoops with a forward curve and are very short radially, being about one-sixteenth the diameter of the fan. Thus there is radical departure from the principle that a centrifugal fan should gradually accelerate particles of air. There are 64 blades, and these are about three-fifths of the fan diameter in width. The peripheral edges are slightly nearer than the inner edges to avoid eddies between the blades. Another characteristic of the Sirocco fan is a large inlet of practically the same diameter as the fan itself. In short, the fan may be defined as resembling the Rateau or Ser fans, yet with important differences, having greater width in proportion to length and a larger inlet. These improvements give great capacity in proportion to size and some tests of the Sirocco show such startling results as apparently to discredit some accepted theories. One of the paradoxical results is that the air escaping from the fan has a higher speed than the tips of the blades. It has been held that the velocity with which the air leaves the tips of the blades in a centrifugal fan is theoretically the same as the circumferential velocity of the fan, and in actual practice somewhat less. Actual measurements in the case of Sirocco fan prove that the air leaves the periphery with a velocity about 80 per cent greater than that of the fan. This means that a small fan of this type will deal with a much greater volume of air than a larger fan of an old type. While the useful effect is higher in the Sirocco fan, the actual water gauge is greatly in excess of the so-called theoretical or calculated water gauge, and yet the fan has a lower circumferential velocity than any type of fan in use. These results may follow from the inventor's minimizing those losses in centrifugal fans caused by the eddying of the air, by the contraction of area at the intake, and by friction along the blades.



SIROCCO FAN AT PELTON COLLIERY—CROSS-SECTION.

The first Sirocco fan to be erected for mine ventilation is now in use at the Pelton colliery, Durham county, England. The accompanying drawings show the construction and mounting. The fan, 75 in. diameter, has a double inlet, and while there is a central plate, the circle of the inner edges of the blades is smaller than the intake opening, hence no throttling of the air is possible. A unique test recently showed the capacity of this fan. At the mine were two Guibals, one 36 ft., and one 30 ft. in diameter. These fans were connected with the air-shaft by masonry air-ways. The Sirocco

was connected with the shaft by two air-ways of approximately the same length, area and cross section as those supplying the Guibals. The results were remarkable, as may be seen from the table, the 75-in. Sirocco actually handling more air than the two great Guibals, and

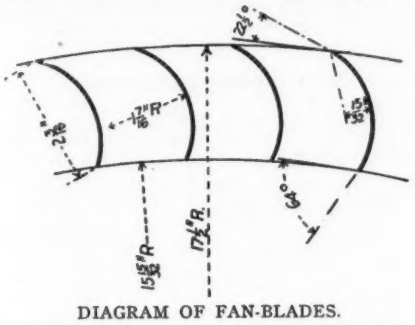
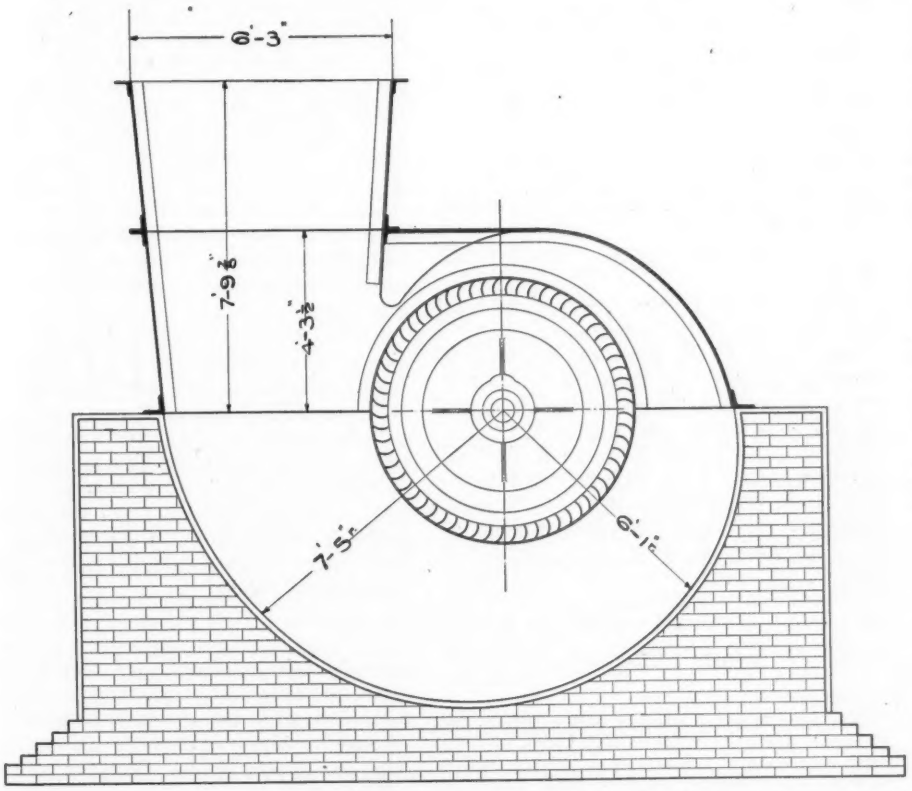


DIAGRAM OF FAN-BLADES.

at a lower peripheral speed. Owing to the Sirocco being driven by an electric motor, and



SIROCCO FAN AT PELTON COLLIERY—SECTION.

the Guibals by steam engines, there was difficulty in comparing efficiencies. However, the Sirocco fan was driven by a motor developing, by current readings, 156 h. p., while the combined indicated h. p. of the Guibal engines was 175. It is evident that the Sirocco fan will receive the close attention of progressive colliery engineers the world over.

The fan is made by Davidson & Company, Ltd., of Belfast, Ireland. Their American representative is the Sirocco Engineering Company, of 22 Thames street, New York.

EFFECT OF GASEOUS CONTENTS ON PIG IRON.*

By James Gayley.

One point has been brought out in a discussion of iron for foundry purposes, and that is that much trouble may arise from the content of oxygen. It occurs to me that much valuable time is lost in looking for some unusual content in pig iron, to which great and mysterious influences are attached, whereas the conditions under which iron is re-melted, the content of sulphur in the coke, and the amount of scrap that is mixed with the iron, about which generally the founder knows little or nothing, exert a far greater influence.

I recall an experience I had when connected with the Carnegie Steel Company, in endeavoring to find out the superiority of charcoal iron for the making of car-wheels. A certain grade of charcoal iron which contained about 0.75 phosphorus had given excellent results in the making of car-wheels, and, inasmuch as we had on hand a stock of ore at one of our furnaces exceedingly low in phosphorus, we concluded to make some iron on a very low temperature of blast that would contain about 0.03 phosphorus. This iron we made with a hot blast temperature of 300° F., as against the charcoal iron with 500°. The resultant metal contained approximately, as I recollect, the same percentage of silicon and carbon as the charcoal metal, but it did not yield the same results in the manufacture of car-wheels.

Before making this experiment I had consulted with Mr. Wm. Metcalf, of Pittsburg, who has long been known as a very careful investigator in iron and steel metallurgy, as to the superiority of charcoal iron, and he had suggested that it was perhaps due to the absorption of nitrogen, that he had found a very great variation in content of nitrogen in various steels, and that the charcoal iron with a cold blast would absorb less nitrogen than iron made with a hot blast, irrespective of whether the fuel was charcoal or anthracite. In order to test this the low phosphorus iron was manufactured with a blast temperature of 300°. Samples of this low phosphorus iron and the charcoal iron, and of our standard Bessemer iron and a piece of basic iron taken indiscriminately from a pile containing about 0.50 phosphorus, were sent to Professor Langley for determination of nitrogen. We looked forward with keen interest to the returns from these samples, expecting that the low phosphorus and the charcoal iron would show so much better, but instead the basic iron, from which we expected nothing, was materially lower in content of nitrogen, and was made perhaps with the highest temperature of hot blast.

Since that time I have regarded with more or less indifference the claims that are put forward respecting the great influence that is exerted by the gaseous content in pig iron. Both the steel maker and the foundrymen will obtain far better results when pig iron can be made with far more uniformity than is possible under present conditions. In a furnace using Lake Superior ores it requires approximately 7,200 lb. of raw material and 11,700 lb. of air to produce a ton of iron. The raw material is controlled now within a variation of 10 per cent, whereas the air will vary in a single day as much as 100 per cent. Experiments are now under way which will demonstrate during the current year what increase in uniformity can be obtained in the blast furnace, by making the air consumed per ton of pig iron as uniform as the raw material.

*Extract from discussion of paper on 'Chemical Specifications for Pig Iron,' American Institute of Mining Engineers, February, 1904.

PHOSPHATE IN SOUTH AUSTRALIA.—Reports from Adelaide state that promising deposits of phosphate have been discovered in the Kapunda and Burra districts, in South Australia. An advantage is proximity to railway communication. A syndicate at Adelaide, headed by Joseph Provis, is inspecting the Kapunda field, while in the Burra district, William West, manager of the Burra Burra copper mines, discovered high-grade phosphate on the company's land. At the latter place work has already begun to mine the mineral, and it is proposed to erect the necessary machinery for manufacturing superphosphate for local use.

Pulverized asbestos waste and serpentine make an excellent fire-proof product for buildings.

Make of fan.	Diam. of fan in feet.	Speed of fan in revs. per min.	Periphery speed in feet per min.	Area of drift in sq. ft. where air measured.	Average velocity of air in feet. per min.	Volume in cu. ft. per min. passing through each drift.	Total volume in cu. ft. per min.	Excess of air by Sirocco fan in cu. ft. per min.
Guibal No. 1	30	62	5843	72.305	957.96	69,265	199,138	
Guibal No. 2	36	52	5880	108.500	1196.99	129,873		
Sirocco	6.25	294	5771	82.800	983.44	81,428	220,484	21,347
				105.500	1318.08	139,057		
Guibal No. 1	30	62	5843	72.305	985.32	71,243	200,252	
Guibal No. 2	36	52	5880	108.500	1189.03	129,009		
Sirocco	6.25	294	5771	82.800	1014.36	83,989	225,624	25,372
				105.500	1342.52	141,635		

RECENT LITERATURE ON ECONOMIC GEOLOGY.—IX. PHOSPHATE AND GYPSUM.

By EDWIN C. ECKEL.

The Phosphate Rocks of Arkansas. By J. C. Branner and J. F. Newsom. *Bulletin* 74, Arkansas Agricultural Experiment Station. Octavo, 67 pages.

Three areas containing phosphate rock are described. The first and most important lies north of the Boston mountains and west of Black river; the second occurs in the Cretaceous area of southwestern Arkansas; and the third area lies to the north and west of Hot Springs. The data presented on the second and third areas are very incomplete, and apparently little is really known concerning the extent or value of the phosphate deposits which may occur in them.

The first area, however, seems to be of some importance. The phosphates here occur as nodules associated with the Devonian sandstones and shales; and therefore occupy approximately the same geologic horizon as the Tennessee black phosphates. Analyses of average specimens, quoted in the report, show 30 to 70 per cent calcium phosphate, with 4 to 20 per cent of iron oxide and alumina. This would not be particularly encouraging, but it is reported, since Dr. Branner's report was prepared, that deposits of higher grade rock have been found in this area.

Larimer County Gypsum (Colorado). By H. A. Lee. Vol. XXI, pp. 35-37.

The gypsum deposits of Larimer county occur in a basin between rocky ridges, associated with strata of Jura-Cretaceous age. The main quarry is situated on a knoll showing a face of compact gray gypsum 250 ft. long and 28 ft. high in the middle, thinning to 7 ft. at the ends of the quarry, covered by only a few feet of stripping. The gypsum is blasted out, auger holes being bored to receive the charges.

Recent Developments in the Gypsum Industry in New York State. By A. L. Parsons. *Twentieth Annual Report,* New York State Geologist, pp. 177-183.

This paper contains descriptions of the gypsum rock deposits in central and western New York at Fayetteville, Union Springs, Marcellus, Mumford and Oakfield. These deposits are in beds ranging from 2 to 30 ft. in thickness, and occur in the Salina group (Silurian). The gypsum worked in the western portion of the State is apparently purer than that mined in Onondaga county.

During the past few years an extensive wall-plaster industry has become established in New York; previously, almost all of the gypsum was used in the crude form as land plaster. A number of wall-plaster plants are described by the author. Several of these plants use the Cummer process of calcination—a continuous process apparently much more economical than the kettle process which is so largely used in western plaster plants.

The Laramie Cement Plaster. By E. E. Slosson and R. B. Moudy. *Tenth Annual Report,* Wyoming College of Agriculture and Mechanics.

The Laramie cement plaster is made from gypsum obtained just south of Laramie, Wyoming. The deposit here is of gypsite, or gypsum earth, and is derived primarily from the Triassic beds of the region, which contain much gypsum. One particular gypsum bed of considerable thickness occurs in the lower part of the Triassic series, about 200 ft. above the Permian sandstone. The disintegrated gypsum along the outcrop of this and similar beds has been gradually washed down and re-deposited as gypsite in depressions in the plains below. The gypsite bed worked near Laramie averages nine feet in thickness, being divided into two strata by a five-inch layer of red clay. A considerable percentage of impurities, chiefly silica and lime carbonate, occur in the gypsite.

THE IRON AND STEEL INSTITUTE.

The annual meeting of the Iron & Steel Institute will be held in London, England, May 5 and 6. The meetings will be held in the hall of the Institution of Civil Engineers.

The following is a list of papers submitted for this meeting:

Pyrometers Suitable for Metallurgical Work. Report of Committee.

Coke Ovens. By C. Lowthian Bell.

Troostite. By H. C. Boynton.

The Range of Solidification and the Critical Ranges of Iron-Carbon Alloys. By H. C. H. Carpenter and B. F. E. Keeling.

Explosions Produced by Ferrosilicon. By A. Dupré, chemical adviser to the Explosives Department, and Capt. M. B. Lloyd, inspector of explosives.

Thermal Efficiency of the Blast-Furnace. By W. J. Foster.

Production and Thermal Treatment of Steel in Large Masses. By Cosmo Johns.

Manufacture of Pig-Iron from Briquettes at Herräng, Sweden. By Professor H. Louis.

Reports on research work carried out during the past year will be submitted by C. O. Bannister, London; P. Breuil, Paris; K. A. Gunnar Dillner and A. F. Enström, Stockholm; J. C. Gardner, Middlesbrough; F. H. Wigham, Wakefield; A. Campion, Cooper's Hill, and by P. Longmuir, Sheffield, Andrew Carnegie research scholars.

BOOKS RECEIVED.

In sending boooks for notices, will publishers, for their own sake and for that of book buyers, give the retail price? These notices do not supersede review in a subsequent issue of the ENGINEERING AND MINING JOURNAL.

Bulletin of the Imperial Institute. Volume I, 1903. London, England: published by the Institute. Pages, 220; with maps.

Wyoming Mines and Minerals in Brief. By Henry C. Beeler, State Geologist. Cheyenne, Wyoming: State Printers. Pages, 16.

Geological Commission of Finland. Bulletins 1-13, inclusive. Helsingfors, Finland; published by the Commission. Pages, 972; with maps and illustrations.

The Central State. South Australia, Its History, Progress and Resources. By David J. Gordon. Adelaide, S. A.; Vardon & Prichard. Pages, 236; illustrated.

The Assuan Reservoir and Lake Moeris. By Sir William Willcocks. London: E. & F. N. Spon, Ltd. New York: Spon & Chamberlain. Pages, 76; illustrated.

The Journal of the Canadian Mining Institute. Volume VI., 1903. Edited by B. T. A. Bell, Secretary. Ottawa, Canada: published by the Institute. Pages, 520; illustrated.

Manual of American Street Railways, 1904. New York: Poor's Railroad Manual Company. Pages, 840.

Geologic Commission of Finland. Geological Map, Section C2, St. Michel. Helsingfors, Finland: published by the Commission. Map, with explanatory comment, 112 pages.

BOOKS REVIEWED.

Lehrbuch der Bergbaukunde. Sixth edition. By G. Kohler. Leipzig, Germany: Wilhelm Engelmann. Pages, 856; illustrated. Price (in New York), $7.

The high appreciation of this standard treatise is evidenced by the demand which calls for a succession of new editions. The second was published in 1887, the third in 1892, the fourth in 1897, and the fifth in 1900. The diminishing time between editions indicates that the book, like wine, improves with age. This can be said of a technical work, however, only when it is kept well up to date, which Professor Kohler has succeeded in doing in his several editions. The sixth has undergone an important enrichment in nearly all its sections. Among other things are discussed the latest improvements in deep-drilling machines, mining methods in Westphalia, shaft sinking, and mine ventilation. Some less important and out of date portions of the previous edition have been omitted, but the size of the book in its latest edition has increased considerably, notwithstanding.

Professor Kohler's treatise is so much of a classic and its character is so well known that special reference at this time is unnecessary. It is especially a text-book for students, but it is also valuable to the professional man as a reference book, and although it is stronger in its treatment of European practice than American, it is nevertheless a work that may be profitably studied by American students, who will learn to esteem it as highly as their predecessors have done.

Geologic Atlas of the United States. Folio No. 96, Olivet; No. 97, Parker; No. 99, Mitchell; No. 100, Alexandria, South Dakota. Washington. Engraved and published by the United States Geological Survey. Price, 25 cents.

These four folios describe an area almost in the center of the State of South Dakota. The Olivet quadrangle covers an area of 871 sq. m., including parts of Hutchinson, Bonhomme and Yankton counties. The Parker quadrangle covers an equal area, chiefly in Turner county, but including also portions of Hutchinson, Yankton and Clay counties. The Alexandria quadrangle lies north of the Hutchinson, and comprises an area of 863 sq. m., mostly in Hanson county, the remainder being in Miner, Sanborn, McCook and Dawson counties; the Mitchell quadrangle, adjoining the Alexandria on the west, also covers an area of 863 sq. m., and includes portions of Dawson, Aurora, Sanborn and Jerauld counties. These areas lie mostly in the valley of the James river, though the Parker quadrangle covers also part of the valley of the Vermilion river; both these streams are southward-flowing tributaries of the Missouri. All four areas are topographically a nearly smooth plain. The highest elevation determined is 1,750 ft. on Turkey ridge, in section 5, T. 97, R. 55, in the

Parker quadrangle, and the lowest elevation, 1,175 ft. in the James river bottom, the average elevation of the country being about 1,500 ft. Turkey ridge is a morainic hill, having an elevation of 200 to 300 ft. above the surrounding country.

The rock strata, except for the Sioux quartzite of Algonkian age, and gray granites of Algonkian or Archean age, are of Cretaceous age, the Dakota formation of the Colorado group and the Pierre shale outcropping. Certain light colored loams may be late Tertiary. The Pleistocene deposits, which form the most conspicuous geologic features of the region, cover nearly the whole surface. They include glacial sands and gravels, boulders, clay and alluvium. The deposits of economic importance include building stone, particularly the Sioux quartzite, a most durable rock, and certain Cretaceous chalkstones, which, though soft and quarried, harden on exposure and are fairly durable. Clay deposits of economic importance in the Pleistocene are rare. The Cretaceous clays are of value, but are exposed only in a few areas. Of most interest to residents of the district is the possibility of getting water from artesian wells, and the general circulation of the underground water. This question is discussed in some detail in each of the folios.

Geologic Atlas of the United States. Folio 98. Tishomingo, Indian Territory. Washington; engraved and published by the United States Geological Survey. Pages, 8; with maps. Price, 25 cents.

The folio describes an area 34.5 miles long and 28.5 miles wide, containing about 986 sq. m., in the southeastern part of the Chickasaw Nation, Indian Territory, near the Choctaw-Chickasaw boundary line. The quadrangle occupies part of three physiographic regions, the Arbuckle mountain, the Arkansas valley and the Red river plain. The first is a nearly flat plain, sloping toward the south and having a maximum height of 1,350 ft.; the Arkansas valley, bordering this on the northeast, enters the quadrangle in but two small areas; the Red river plain, south of the Arbuckle mountain region, is a nearly flat plain, extending the entire south side of Indian Territory, and having a height along its northern border of about 1,000 ft. These three physio-geographic regions are due largely to differences in rock types.

The rocks of the Arbuckle mountain include the Tishomingo granite, overlaid by Cambrian, Silurian and Devonian strata. The Cambrian rocks are the Reagan sandstones, having a maximum thickness of about 500 ft.; the Arbuckle magnesian limestone, in the main, is a massive formation having a maximum thickness, of over 4,000 ft., and of Cambro-Silurian age. The Ordovician rocks include the Simpson formation, sandstones, limestones, shales and marls, 1,200 to 2,000 ft. thick, and the Viola limestones, about 700 ft. thick. The Silurian is represented by the Sylvan shale, 60 to 300 ft. thick. Above these come the Hunton limestone, from nothing to 200 ft. thick, of Siluro-Devonian age, and the Woodford chert, of Devono-Carboniferous age. The section below the Carboniferous in the Arbuckle mountain region is of interest, because of the great thickness of limestones and dolomites in practically unbroken sequence. The Carboniferous formations include the Sycamore limestone, 50 to 130 ft. thick; the Caney shale, perhaps 1,600 ft. thick, both of Mississippian age, and the Glenn formation, shale and sandstones of unknown thickness, and the Franks conglomerate, about 200 ft. thick, of Pennsylvanian age. The rocks of the Red river plain, of Cretaceous age, include limestones, friable sandstones, clays and shales, with a gentle dip to the south and a total thickness of about 1,000 ft. They represent the whole of the lower Cretaceous and the basal formation of the upper Cretaceous. The mineral resources of the quadrangle are asphalt, granite, limestone and clay; of these, asphalt is the only one that has been developed to any considerable extent. The Tishomingo granite makes a handsome building-stone.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.

Letters should be addressed to the EDITOR.

We do not hold ourselves responsible for the opinions expressed by correspondents.

Reflectors in Mines.

Sir.—In reply to the question, Are reflectors used in mining? the writer has used them more or less for 23 years, whenever conditions permit.

In the sinking of shafts a sun-dial answers the purpose. By night and on cloudy days an oil-lamp should be properly placed, so as not to be in the way, and protected by glass from the winds. For long, dark tunnels and drifts a coal-oil can, with two sides replaced with glass, and the inside of the two remaining sides quicksilvered, answers the purpose, when nothing better is at hand. This is both convenient and economical. But often more than a request is required to enforce their use. As one miner said when requested to dispense with the candle, "I have mined for more than 30 years and do not have to work for an outfit which depends on earning dividends by the saving of tallow." Of course, his valuable services had to be sacrificed.

F. A. WEBER.

Lakeview, Idaho, April 7, 1904.

Oil Concentration on Copper Ores.

Sir.—In my article on the 'Cheticamp Mining District,' which appeared in the ENGINEERING AND MINING JOURNAL, February 12, 1904, in referring to the recovery of values from the ore of the Eastern National Copper Company's property, in Cape Breton, your printer made me say that "the 'ore' concentration process will give satisfactory results." If you will turn to the manuscript you will see that the correct reading was "the 'oil' concentration process will give satisfactory results." This is clearly a compositor's error, in substituting the word ore for the word oil.

I am reminded of this error by a letter from Mr. A. Stanley Elmore, the inventor of the oil process, who asks me to correct the slip. In this connection, I may say that the high concentration of 94.4 per cent of the copper values, in one of the tests, was obtained through the Elmore process; which, your readers are aware, has recently been installed in the Rossland camp in British Columbia.

F. P. RONNAN.

Halifax, N. S., April 6, 1904.

ABSTRACTS OF OFFICIAL REPORTS.

Rio Tinto Company, Ltd.

This company operates the well-known copper mines of Rio Tinto, in Spain. Its report covers the year ending December 31, 1903.

The capital account shows £1,625,000 in 5 per cent preference shares; £1,625,000 in ordinary shares, and £3,101,980 in 4 per cent first mortgage bonds. The reserve fund, at the close of the year, amounted to £500,000. The provident fund, for the benefit of the employees, amounted to £31,422.

The income account for the year is as follows:

Balance forward from 1902	£23,547
Profit on sale of produce	1,648,110
Interest, rents, etc	43,613
Total receipts	£1,715,270
Interest and taxes	236,391
General expenses	70,330
Depreciation accounts	49,952
Redemption of mortgage bonds	71,220
Set aside to reserve fund	50,000
Provident fund	2,500
Total charges	£480,393
Net balance	£1,234,877
Dividends paid and declared	1,214,688
Balance to 1904	£20,189

The dividends were 5s. per share, or 5 per cent on the preferred stock, and 70s. per share, or 70 per cent on the ordinary stock.

The product of the company's mines for the year is reported as below, in long tons:

Mined:	1902.	1903.	Changes.
For shipment	627,967	688,919	I. 60,952
For local treatment	1,237,322	1,229,619	D. 7,703
Total	1,865,289	1,918,538	I. 53,249
Av. per cent copper	2.517	2.390	D. 0.127
Shipped:			
Pyrites	595,092	667,748	I. 72,656
Sulphur ore	117,704	118,171	I. 467

Of the pyrites shipped in 1903, Germany took 264,235 tons, Great Britain 240,268 tons, and the United States 163,245 tons. The production of pyrites was the largest ever reported, with the exception of 1901, when it was 1,928,776 tons. The average copper content was the lowest ever reported.

The production and sales of copper for the year are reported as follows, in long tons:

	Produced.	Sold.
Refined copper	21,565	22,208
Copper in sulphate	.....	1,484
Copper in pyrites	14,245	12,669
Total	35,810	36,361

The total copper produced at the mines in 1902 was 21,659 tons, showing a decrease last year of 94 tons.

On the North lode, 415,222 cub. m. overburden were removed, the cost being charged to revenue. On the South lode opencast, 592,496 cub. m. overburden were removed, the cost also being charged to revenue. In the Lago opencast, 265,978 cub. m. overburden were removed and the extraction of mineral was begun, 52,909 tons having been raised. From the Dehesa mass, 290,563 cub. m. overburden were removed.

The contents of the reserve heaps in fine copper were estimated at 147,685 tons at the close of the year. The yield by washing continues satisfactory. The smelting and bessemerizing plant at the mines gave satisfactory results. This plant has made a considerable saving in the cost of producing copper. These new works have also made it possible to release a large part of the copper formerly locked up at Cwmavon. In 1903, there were 2,285 tons of that copper sold.

The railroad and shipping pier have been kept in good working order. The outside traffic over the railroad was very good.

The average price of standard copper was £58 3s. 1d., against £52 11s. 5d. in 1902.

Horn Silver Mining Company.

This company operates a silver-lead mine near Frisco, Utah. The report is for the year ending December 31, 1903. The total development work done during the year was 1,165 ft. drifts, cross-cuts and raises.

The total ore mined was 17,348 tons, of which 10,984 tons were milling ore and 6,364 tons shipping ore. The cost of mining was as follows, per ton: Labor on ore, $1.986; labor on dead-work, $0.792; labor on surface, $0.924; supplies, timber, fuel, etc., $1.080; total, $4.782 per ton. The milling ore was concentrated into 2,297 tons, or at the rate of 4.8 tons into 1. The cost of milling was: Labor, $0.844; supplies, fuel, etc., $0.509; total, $1.353 per ton. The statement of ore shipments is as follows:

	Tons.	Value per ton.
First-class crude ore	5,413	$13.08
First-class lease ore	709	29.86
First-class copper ore	242	15.21
Concentrates	2,297	15.47
Total	8,661	$14.42

The contents of the ore were 836 oz. gold, 96,027 oz. silver, 432,409 lb. copper and 5,505,694 lb. lead.

The receipts and expenses, with the averages per ton mined, were as follows:

	Amount	Per ton.
Sales of ore, concentrates, etc.	$126,361	$7.28
Store at Frisco	7,539	0.44
Interest, etc.	4,578	0.26
Total receipts	$138,478	$7.98
Mining expenses	$82,984	$4.78
Milling expenses	14,867	0.86
Cave lease	2,290	0.13
General expenses	33,822	1.95
Total expenses	$133,963	$7.72
Net earnings	$4,515	$0.26

To the net earnings are to be added $66,750 brought forward from 1902, making a total of $71,265. From this one dividend of 5c. per share, or $20,000 in all, was paid, leaving a balance of $51,265 on hand.

The report says: "Development work south on the 400-ft. level, and from there extending up 200 ft. has been very satisfactory. We have large bodies of lead ore, as also high-grade copper ore, developed in this part of the mine. The zinc ore developed in addition to the high-grade lead and copper ores has been first class. We have entered into contract for the sale of 50,000 tons of zinc ore, which we anticipate will be carried out.

"The important work now being performed is in the north territory and in new ground. The 700 is very promising. We have now a large face of shipping ore opened up in addition to the large amount of what we term 'mill ore.' This grade of ore, however, contains 16 per cent lead, 15 oz. silver, and 0.03 oz. gold. We have entered into contract with the American Smelting & Refining Company for the output of the mine for the ensuing year on terms which we regard as very satisfactory, being much better than anything we have heretofore obtained."

Tamarack Mining Company.

This company operates an important copper mine in the Lake Superior district. Its report is for the year ending December 31, 1903. The financial statement shows assets as follows: Cash and accounts receivable, $770,499; supplies at mine, $300,950; wood and timber lands, $243,729; Hancock & Calumet railroad bonds, $99,000; Mineral Range railroad stock, $364,700; Lake Superior Smelting stock, $100,000; total, $1,878,878. Bills and accounts payable amounted to $1,101,847, showing a surplus of $777,031 at the close of the year.

The earnings and expenditures of the company, with the averages per pound of refined copper made, were as follows:

	Amount.	Per lb. copper.
Copper, 15,286,093 lb.	$1,990,045	13.02
Interest and miscellaneous	52,178	0.34
Total receipts	$2,042,223	13.36
Running expenses at mine	$1,524,119	9.97
Smelting, freight and other expenses	210,391	1.38
Construction expenses	22,648	0.15
Total expenses	$1,757,158	11.50
Net profit	$285,065	1.86

From the profits one dividend of $1.50 per share was paid, requiring $90,000, and leaving a balance of $195,065. Adding to this the balance of $581,966 brought forward from 1902, made a total surplus of $777,031 at the close of the year.

Some comparative results are given as follows:

	1902.	1903.		Changes.
Rock stamped, tons.	658,720	657,920	D.	800
Mineral saved, lb.	25,747,931	24,055,512	D.	1,692,419
Refined copper, lb.	15,961,528	15,286,093	D.	675,435
Copper in mineral, %	61.99	63.55	I.	1.56
Copper per ton rock, lb.	24.2	23.2	D.	1.0
Copper per ton rock, %	1.21	1.16	D.	0.05
Cost of mining, per ton	$2.0670	$2.0576	D.	$0.0094
Cost of stamping, per ton	0.2330	0.2624	I.	0.0294
Total, per ton	$2.3000	$2.3200	I.	$0.0200

The increase in cost of stamping is due partly to the suspension of shipments from the Tamarack Junior mine, which reduced the tonnage stamped about 100,000 tons; and partly to extensive repairs on the boiler plant at the old mill. The plant is now in good condition.

No. 3 shaft was sunk 81 ft. The depth of the several shafts is now as follows: No. 1, 3,409 ft.; No. 2, 4,356 ft.; No. 3, 4,973 ft.; No 4, 4,450 ft.; No. 5, 4,938 ft. Other development work included 8,694 ft. drifting and cross-cutting, and 1,293 ft. sinking winzes.

At No. 5 shaft, drifting in the lode during the year aggregated 5,077 ft. Favorable conditions have continued, and at the close of the year this branch of the mine possessed openings aggregating more than 2,100 ft., which have provided stoping ground of better than average grade. All the evidence tends to indicate a continuation of present conditions to the boundary lines. If this proves to be the case, territory enough will have been opened to constitute a large mine, with a producing capacity greater than any of the other branches. Soon after the last report was written, it appeared to be good policy to avoid incurring further expense for equipment at No. 5 shaft, until better ground was met with. An order was given, therefore, to stop work on the hoist and compressor then building in Milwaukee. When the openings going south got into good ground far enough to demonstrate the discovery of an extensive block of productive lode, orders were given to finish the machinery, and ship it as soon as practicable. Both machines were shipped in December, and the installation began at once. It is hoped to have both machines in commission by the middle of the year. By that time ground enough will have been opened to provide working places sufficient to supply a larger product than the present equipment could handle, and the new machinery will be a necessary addition.

No. 3 shaft during the year attained the distinction of being the deepest shaft in the world. Its total depth is now 4,973 ft., making it 35 ft. deeper than No. 5 shaft, which, prior to this year, was the only vertical shaft of greater depth.

At No. 2 shaft the operations have been as regular and free from incident as for several years past. Early in the year the cross-cut at the 30th level was equipped with tracks and endless rope haulage, similar in all respects to the outfits in use in the other levels, and openings in the lode at this level have been made, which amount to 679.5 ft. This opening has developed stoping ground of fair quality, and on the south side the drift has evidently penetrated the same shoot of copper ground as the drifts going south from No. 5 shaft.

Calumet & Arizona Mining Company.

This company operates a mine, which last year reached the producing stage, in the Bisbee district in Arizona. Its report is for the year ending December 31, 1903. The financial statement shows assets as follows at the close of the year: Cash and copper on hand, $1,240,544; ore at mine and smelter, $251,700; supplies at mine and smelter, $241,514; accounts receivable, $24,855; total assets, $1,758,613. The liabilities were bills and accounts payable amounting to $317,139, leaving a net balance of $1,441,474 at the close of the year.

The total production of copper was 12,768 tons. The product in gold and silver was $144,862, showing an average of $11.35 per ton of refined copper. The highest price received for copper this year was 14.48c., the lowest, 11.50c., the average price for the year being 13.088c. The average return to the company, after deducting refining charges, commissions, freight, insurance, assaying, sampling and weighing, was 11.558 cents.

The smelter now produces blister copper, 99 per cent fine. All the company's copper is treated electrolytically by the Nichols Chemical Company, requiring fully three months after shipment before delivery as refined copper, and four months after shipment before proceeds are received. The company has renewed its contract with Phelps, Dodge & Co., as selling agents for 1904 and 1905.

No. 2 furnace went into commission in April; No. 3 was not blown in until after the close of the year; No. 1 was then shut down for repairs. The company will now be able to run two furnaces continuously. The average number of men employed for the last half of the year was 723; of this number 409 were employed at the mine, and 314 at the smelter.

A dividend of $400,000 was paid December 19. 1903, being $2 per share.

The mine report shows 650 ft. shaft sinking. 9,290 ft. drifting and 2,227 ft. raises and winzes. The ore mined was 150,070 tons; ore shipped, 148,584 tons; ore smelted, 145,916 tons. The recovery was 178 lb. of copper per ton. The average copper recovery was 8.88 per cent, and the average slag assay, 0.59 per cent, showing a total of 9.47 per cent copper in the ore. The total ore in the stock pile, bins, and at smelter at the close of the year was 25,170 tons. The smelter is now treating 600 tons per day. Additional buildings and machinery during the year included new furnaces and a converter, with the necessary buildings, store house, repair shop and tank for fuel oil. The ore bins were enlarged, a new boiler, 300 h. p., a new 16-drill compressor and a station pump were put up.

QUESTIONS AND ANSWERS.

Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.

Tripoli.—Can you furnish me with the following information in connection with mining of tripoli in this country: Location of various mills; amount produced annually; for what purposes used; cost of manufacturing different grades?—C. H. Y.

Answer.—Tripoli is silica in a nearly pure form, very similar to diatomaceous earth, and other forms which are used for similar purposes. The tripoli at present produced comes almost entirely from a deposit in Missouri, which is operated by the American Tripoli Company. The quantity produced is not far from 1,000 tons yearly. It is used as an abrasive and for polishing metals. It is made up in various forms for sale as a polish. It is also used in filtering liquids, and, on account of its absorptive qualities, for making blotting paper. We have no data as to the cost of manufacture.

Strontium Carbonate.—Can you give me any information as to the value and market for strontium carbonate containing 35 per cent SrO as $SrCO_3$, and 15 per cent silica?—S. H. K.

Answer.—In consequence of the limited demand for strontia, principally from manufacturers of pyrotechnics, there is no regular market price for strontium carbonate in this country. Consumers make contracts for supplies some time in advance, at prices that are governed by the conditions in the European market. In Germany, where the strontia process for separating sugar from the beet molasses at the Dessau works has been developed successfully, strontium carbonate is consumed in quantity. The precipitated strontium carbonate, or white mud, is also utilized, being dried and pressed into bricks for the refining furnace. At Hanover, Germany, strontium carbonate in the native state is worth about 34@35 marks per 100 kg., or, say, 3.67@3.79c. per pound. Specially precipitated strontium carbonate, for making pyrotechnics, is quoted at 100 marks per 100 kg. (10.8c. per lb.), for the pure white quality, and 45 marks per 100 kg. (4.8c. per lb.), for the commercial white. Prominent dealers are the Roessler & Hasslacher Chemical Company, 100 William St., New York, and E. de Haen, Seelze, near Hanover, Germany.

Tin Oxide.—Will you kindly let me know through your Questions and Answers column what the principal uses of tin oxide are, who are the users, and whether any special form is required by the trade; that is, will slightly yellow or gray tin oxide be all right?—N. C. H.

Answer.—Tin oxide or stannic oxide (SnO_2) is a white amorphous powder. It is quite hard, and is used as a polishing material for glass. It is generally mixed with lead oxide and sold under the name of putty powder. Besides its use for polishing purposes, tin oxide is a very important factor in the manufacture of all kinds of glazes in which whiteness is desired; also in the manufacture of enamel. A small quantity of the pure oxide will give enamel an intensely white color, and it is the best and most satisfactory material known for making opaque glaze or glass. The enameling industry consumes considerable quantities. Glazed brick and tile manufacturers also use large quantities of this oxide.

For the uses mentioned above, except for polishing, it will be seen that the white oxide is required, and that any yellow or grayish color would be a drawback. The gray oxide, which is more properly stannous oxide (SnO), has its uses, however; it is employed in glass, enamel, etc., to prevent oxidation, as the stannous oxide will oxidize in preference to anything else. It is also used in the production of copper-ruby glass.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

DUTY ON BORAX-GLASS.—Borax-glass is properly dutiable as borax, being one of the well-known and recognized species or kinds of that article, at the rate of 5 cents per pound under the provisions of paragraph 11, tariff act of July 24, 1897. . . . We are therefore of the opinion that the fused borax, or borax-glass, is but one of the species of borax and as such included within that term as used in paragraph 11, quoted. It may be pertinent to note that the claim asserted is that this material is borate of soda, and that the record shows that the processes through which the material has been put commence with borate of soda, pass through borax, and then to borax-glass, so that the material is further removed from borate of soda than it is from borax, if it is removed. We think the word 'borax' as used in the paragraph is used in its plain and ordinary meaning, embracing therewithin all materials and substances that are naturally comprehended within the meaning of that term, and that as such the weight of authority seems to regard borax-glass as one of the species of borax, it being fused or heated borax.

The protests are overruled and the decision of the collector affirmed in each instance.—Appeal of F. W. Braun & Co. from Collector of Customs at Los Angeles; Board of General Appraisers.

GROUND-SLUICE MINING IN CALIFORNIA.—In an action by a county as owner of certain land to enjoin defendants from discharging debris from their mineral lands into a certain creek, to the injury of plaintiff's said property, a finding that the property in question was 'adjacent' to the creek is sustained by the evidence, where it appears that it is all near the river, although none of it borders thereon. To be 'adjacent' to the creek, it is not essential that the property should be in actual contact therewith. A thing is adjacent to another when it lies near or close to it, although it is not in actual contact therewith.

In such a case, where the court is justified in concluding that the operations of defendants constituted a public nuisance, specially injurious to plaintiff as a property owner, the plaintiff can maintain an action to enjoin them; and where the county is not suing to protect the rights of others, but purely in its proprietary capacity, as the owner of certain real property, the nuisance is also a private nuisance.

Where the object of such an action was to restrain the defendants from working their own mining property in a certain way, the allegations of the complaint are clearly confined thereto, and so far as the complaint is concerned the allegation with regard to the water used by the defendants is referred to merely as an instrumentality in working said property, and there is no allegation that defendants ever suffered or threatened to suffer any one else to use their water for mining purposes, the case made by the complaint related solely to the mining operations of defendants on their own lands, and a provision in the decree restraining defendants from suffering others to use their water supply for the prohibited purposes in any other grounds or mine is not within the issues and unwarranted.

In such a case, where a portion of the decree is open to the construction of forbidding an absolute *bona fide* sale or transfer by defendants of their mining property, which may be put to a lawful and proper use, to any person who may have the intention to work or use the same by the hydraulic process or ground-sluice process, and discharge the debris therefrom into the river, creek or tributaries thereof, if defendants have knowledge of such intention on the part of the purchaser, it is a violation of the rights of property, and unwarranted.—County of Yuba v. Kate Hayes Mining Company; Supreme Court of California.

PATENTS RELATING TO MINING AND METALLURGY.

UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the ENGINEERING AND MINING JOURNAL upon the receipt of 25 cents. In ordering specifications correspondents are requested to name the issue of the JOURNAL in which notice of the patent appeared.

Week Ending April 5, 1904.

756,211. PRECIPITATING METALS FROM Solutions.—Chas. Butters, Berkeley, Cal. An improvement in the process of precipitating metals from solutions, chiefly cyanide solutions, which consists in employing cathodes having surfaces of tin and a high-density electric current.

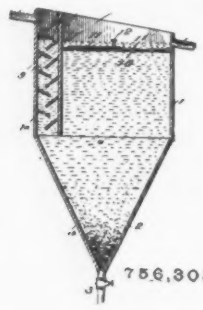
756,223. PROCESS OF TREATING LOW-GRADE ORES AND TAILINGS BY ELECTROLYSIS.—Ernst Fahrig, Philadelphia, Pa. A process of treating low-grade ores and tailings by electrolysis for regaining the precious metals contained in the same, which consists in grinding the ore or tailings, then mixing the same with a suitable quantity of water and a suitable electrolyte so as to form a pulp, passing said pulp by gravity between a series of pairs of inclined anode and cathode plates arranged tower fashion one below the other, and removing from time to time the precious metal deposited on said cathode-plates.

756,225. GAS-RETORT CHARGER AND DISCHARGER.—Walter W. Fiddes, Bristol, England, assignor of one-half to James George Willcox Aldridge, Westminster, England. A discharging-charger for drawing and charging gas-retorts, consisting of the two side plates, distance-pieces between the two side plates near their tops, and division-plates pivoted between the two side plates and free to swing forward toward the front of the charger, and a bed-plate on which the parts rest.

756,271. APPARATUS FOR TREATING SOLIDS, SUCH AS ORES, LIQUIDS, OR GASES.—Paul Naef, New York, N. Y. In combination with an apparatus for treating liquids and solids, a settling-tank, an inclined bottom on said tank and means to run sludge from said tank, back to the apparatus.

756,295. ARTIFICIAL STONE.—Virge Steger, Bonham, Tex. A composition of matter for the manufacture of bricks, or the like, consisting of sand, 93 per cent, lime, 7 per cent, and carbonate of soda and water in proportion of 8 lb. of soda to 100 gal. water.

756,305. ORE-CONCENTRATOR.—Calvin G. Weller, Idaho Springs, Colo. A device for use in connection with concentrating ore, the same consisting of a hollow body provided with a tapered lower portion having a valved outlet and having an



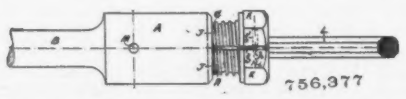
inlet and an outlet at opposite sides, the outlet being at a lower level than the inlet and having the upper portion of the inlet side vertical and the lower portion inwardly inclined, a partition arranged a short distance from the parallel with the vertical portion of the said inlet side, oppositely-inclined plates projected into the space formed between said partition and the vertical portion of the inlet side of the body and alternately disposed and having their inner ends overlapped, and a fine-meshed screen arranged near the upper end of the body just below the plane of the outlet, and a knocker-frame applied to said screen for receiving a light blow when it is required to jar the screen to dislodge material therefrom.

756,307. APPARATUS FOR FEEDING MATERIAL.—William M. Wheildon, Boston, Mass., assignor to Aero-Pulverizer Company, Jersey City, N. J. An improved feeding device, comprising in combination a rotatable table mounted in a horizontal plane, a neck through which the material is fed, a regulating-sleeve moving longitudinally with respect to said neck, a stationary shear extending vertically between the table and neck and inwardly within the space inclosed by the sleeve and arranged out of line with the diameter of the table, and means for manually shifting the position of said sleeve.

756,327. APPARATUS FOR DISTRIBUTING ORE-PULP TO CONCENTRATING-TABLES.—William Carkeek, Butte, Mont.—In an apparatus of the class described, a supply-pipe, a rotary mixer-box having perforations in its bottom, a distributor-chamber having a plurality of openings equally spaced around its periphery, a series of tubes projecting diagonally downward from said openings with respect to the plane of rotation, a series of boxes having partitions diagonally disposed with respect to said plane and interposed in the direction of said tubes, the edges of said partitions being substantially perpendicular to said tubes, and outlet-pipes for said receptacles.

756,328. RECOVERY OF GOLD AND SILVER FROM CYANIDE SOLUTIONS.—Samuel B. Christy, Berkeley, Cal. A process of removing gold and silver from dilute cyanide solutions which consists in forcing said solution to circulate from a storage-tank through a suitable electro-chemical cell and back again repeatedly, so that said solution is brought into intimate contact with anodes and cathodes in rapid alternation and at such a speed that fresh gold and silver bearing solution is brought into intimate contact with the cathodes as fast as the gold and silver are precipitated there and the evolution of hydrogen at the cathodes substantially ceases.

756,377. CHUCK FOR ROCK-DRILLING MACHINES.—Walter E. Kimber, Johannesburg, Transvaal.—In a rock-drill chuck, a body having an



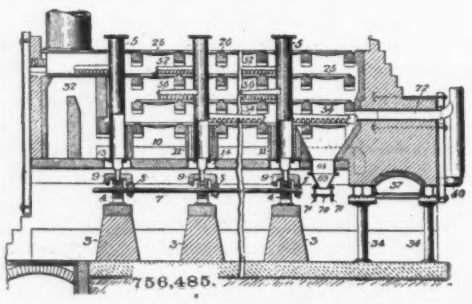
internally-threaded, longitudinally-tapered hole and a correspondingly-tapered, externally-threaded split nut, the sections of the nut being independent and separated, and means independent of the stock of said nut for holding the sections thereof in assembled relation.

756,404. METHOD OF MAKING HOLLOW METAL ARTICLES.—Eugene Polte, Magdeburg-Sudenburg, Germany. A method of making hollow metal articles, which consists in rolling a disc of metal spirally from the center toward the periphery while maintaining its flatness, and then forming it into the desired shape.

756,473. MANUFACTURE OF SHEET-IRON.—Walter Clasper, McKeesport, Pa. A process of making blued sheet iron or steel, which consists in annealing the sheets, and subsequently raising the sheets separately to a low cherry-red heat by passing them singly and processionally and at the same rate of speed with both faces exposed through a furnace having a mild diffused heat therein, and then insuring the proper blued surface by exposing them to slow air-blast cooling.

756,474. APPARATUS FOR THE MANUFACTURE OF SHEET-IRON.—Walter Clasper, McKeesport, Pa. In apparatus for making blued sheet-iron, the combination of a heating-chamber, means for maintaining a uniform heat in said chamber, air-blast apparatus adjacent to said chamber, and mechanism for carrying the sheets in single procession through said heating-chamber and to and past said air-blast mechanism.

756,485. ROASTING OR DESULPHURIZING FURNACE.—Frederic J. Falding, New York, N. Y. A furnace-chamber, provided with transverse arches spaced apart along the length of the chamber and



independent of each other, each having its individual buckstaves and tie-rods, and intervening brick-work occupying the spaces between the arches and completing the furnace side walls.

756,518. GAS-RETORT.—Clarence H. Montgomerie y Agramonte, Mexico, Mexico. A vaporizing-retort having horizontal baffle-plates located therein, an oil-supply pipe leading through the top of said retort and passing through said baffle-plates, a gasifying-chamber surrounding said retort, the wall of said retort forming the inner wall of the gasifying-chamber, said gasifying-chamber having vertical baffle-plates located therein, said retort having an outlet located above the horizontal baffle-plates and leading into said gasifying-chamber.

756,519. TRANSFER-SPOUT FOR GRAIN, ORE, OR THE LIKE.—Peter O. Olson, South Chicago, Ill. The combination with a spout, of a discharging-nozzle rotably secured thereto and communicating therewith, a bar secured horizontally on the nozzle, a lever fulcrumed on said bar near each of its ends, and a roller journaled on the lower portion of each said levers.

756,593. PROCESS OF PRODUCING BRIQUETTES.—John M. Davidson, Beaumont, Tex. A process of producing briquettes consisting in mixing pulverized charcoal with pitch of a high melting-point and adding a neutralizing alkali while the materials are maintained at a high temperature.

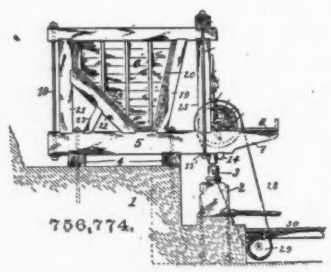
756,598. MINE-CURTAIN RAISER.—Charles J. Diebold, Cleveland, Ohio. In combination, a suspended curtain, arms having their near ends attached to the curtain's lower edge, racks adjacent to the curtain, pinion-segments on the arms meshing with the rack, and means for operating the arms to raise and lower the curtain.

756,669. CEMENT-PLASTER KETTLE.—Charles H. Malone, Acme, Tex. An apparatus for cooking gypsum for converting the same into cement-plaster, comprising the furnace having a fire-box, the kettle proper having a lower half projecting within the fire-box and an upper half of greater diameter than the lower half, and resting upon the walls of the furnace, the hollow shaft extending through the kettle proper and receiving the products of combustion at one end, the stack to which said hollow shaft discharges at its other end, the yielding scrapers supported on the hollow shaft, the discharge spout, and means for controlling the same.

756,682. ARTIFICIAL FUEL.—Maer Moscovitz and Caroline Moscovitz, Great Falls, Mont. A fire-kindler consisting of 1 lb. of paraffin, 1 lb. of sulphur, 2 lb. of bran, and 25 drops of alcohol compressed into suitable form for the purpose specified.

756,738. HYDRAULIC PRESS FOR MINING PURPOSES.—Alfred J. Tonge, Chequerbent, near Bolton, James Tonge, Jr., West Houghton, and Elam Eaves, Stockport, England.—A hydraulic press comprising a body having a series of cylinders, pistons operatively mounted in said cylinders, means for forcing fluid to operate said pistons, and pieces slidingly mounted in said cylinders and adapted to limit the outward movement of said pistons.

756,774. STAMP-MILL.—Martin P. Boss, San Francisco, Cal. A stamp-mill comprising in its construction a mortar, stamps with stems, guides for the stems, an operating-shaft, and a beam anchored



to sustain said guides and the operating-shaft over the mortar at a point beyond the supporting wall or column.

756,798. PROCESS OF MAKING PAVING-BRICK.—Theodore S. Pierce, Detroit, Mich. A process of making paving-brick, which consists in first mixing crushed slag and cement in about the proportions described, thence converting the same to a plastic condition by adding first a solution containing silicate of soda, sal-ammoniac and green vitrol dissolved in water in about the proportions described and thence adding a second solution containing hydrofluoric and muriatic acid diluted with water in about the proportions described, then molding the compound into brick, then air-drying the brick and finally curing the brick by subjecting it to the hot products from burning charcoal and simultaneously spraying it with the first-named solution.

GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy:

Week Ending March 19, 1904.

3,898 of 1903. COAL BORER.—J. T. Blackett, Guisborough. Improvements in the gearing of the inventor's boring machines for use in coal and ironstone mines.

4,101 of 1903. DEEP BORING APPARATUS.—W. Wolski, Schnodnica, Austria. A deep boring apparatus operated hydraulically, in which the water supplies the power and is also used for flushing the hole.

4,894 of 1903. PUDDLING FURNACE.—J. Jones, Tipton. In puddling and other furnaces, providing air passages in the structure, which will heat the air and promote combustion of the fire.

15,420 of 1903. TREATING ZINC ORES.—K. Kaiser, Berlin, Germany. Mixing roasted zinc ores with chloride of zinc so as to form oxychloride, then lixiviating the latter with hydrochloric acid; by this means the whole of the zinc being dissolved from the ore.

27,825 of 1903. ELECTRIC LAMP FOR MINES.—Société des Accumulateures Chelin, Brussels, Belgium. An accumulator electric miner's lamp, in which the contact is made by clamping the lamp to the accumulator and not by means of screw terminals.

783 of 1904. ROCK-DRILL.—L. Christ and C. L. Goerg, Kaiserslautern, Germany. In rotary rock drills, a method for fixing a removable drill to the drill spindle.

SPECIAL CORRESPONDENCE.

Butte. Apr. 9.

(From Our Special Correspondent.)

Probably at no period of Butte's history have more miners found employment than at present. The contrast in this respect is great compared with one year ago. All of the Amalgamated properties are very active. The United Copper Co. and its kindred concerns under Heinze control are working full handed. Now that the new mine equipment recently installed on the Original and Stewart mines belonging to W. A. Clark are in full operation, the output from these properties has been largely increased. Betterments at the Colusa-Parrot smelter, since Mr. Clark has, temporarily, at least, concluded not to build new works, are continually being made. These improvements are in the method of handling the matte. Two blister furnaces were placed in use some little time ago. It has been found necessary to erect a new calcine furnace for bringing the matte to practically a dead roast before it is sent to the blister furnace. Two new McDougal furnaces are building in the department handling raw sulphides.

Last week's letter spoke of the trial for contempt of court against F. A. Heinze, J. H. Trerise and Alfred Frank, the two latter being in the employ of Heinze as engineers, before Judge Beatty in the United States Court. In the Johnston case against the same defendants wherein they are accused of crossing the west end line of the Rarus into the Johnston claim and extracting 11,000 tons of ore, the defendents were also found guilty. No judgment has yet been rendered by the court, the court stating that judgment would be held in abeyance and would depend somewhat on the future conduct of defendants, the Court reserving the right to bring the matter up at any time he felt disposed.

The Supreme Court has reversed Judge Clancy's decision wherein Thomas R. Hinds, as receiver of the Boston & Montana, appointed by Clancy, received a verdict for large fees. This was first tried in 1898. Hinds was made receiver, being in nominal charge for six days, Judge Clancy allowing him $200,000 as fees and $32,000 to his attorneys. These amounts have finally been set aside by the higher court as excessive, and the case is remanded back to the District Court.

Six thousand tons of ore daily are going to the Washoe works. The Boston & Montana smelter at Great Falls is receiving about 2,800 tons. The amount being shipped to the other reduction works brings the production to fully 11,000 tons.

The Conwey Placer Mining Co. at Alder has found it possible to keep two gold dredges working throughout the winter. The company contemplates building two additional dredges. These will, probably, if the plans of the company are carried out, use electric power. N. S. Shaler, professor of geology at Harvard, is president of the company.

Denver. Apr. 8.

(From Our Special Correspondent.)

The mine owners of Telluride, it is now stated, do not propose to enter into any negotiations with the Western Federation of Miners. They claim that the strike is over and that there is nothing to settle, as the mines have full forces of men. The militia at Telluride has been reduced further by the Meeker troop of cavalry having gone home, leaving only the local troop. Part of the troops stationed at Trinidad will probably be recalled within the next few days.

It is now rumored that Mr. Moyer, president of the Western Federation of Miners, will in a few days be turned over to the Federal authorities. He is still held at Telluride.

The receipts of ore from Idaho Springs at the Denver smelters during March were 155 carloads, a gratifying increase over last year.

At the last annual meeting of the Colorado Society of United States Deputy Mineral Surveyors the plan of allowing deputy surveyors from other States to become members was discussed and it was decided, since a number of applications had been received, to make the society an interstate organization, but retain the name for the present.

It is probable that the Page mill at Florence, which has been idle for several years, will start up again before long, treating Cripple Creek ores. A New York syndicate is negotiating for its purchase and will make some changes if the deal goes through.

An important matter for a large part of the State is the present movement to stop the pollution of the Arkansas river, from which a number of cities get their water supply. The directors of the Business Men's Association of Pueblo—that city is one of the worst sufferers—appointed a committee recently to attend the Arkansas valley convention to discuss the subject.

During the past fortnight a large amount of snow has fallen in the mountains on the eastern slope and all fear of a shortage of water for placer mining and irrigations has been dispelled.

The drainage tunnel in the Cripple Creek district seems to prove a great success. Chief Engineer Jaquith states that the flow now amounts to about 6,800 gal. per minute and the water in the mines which are being drained by the tunnel is gradually receding. The Mary McKinney management states that it expects the mine to be dry at the 600 ft. level within a few days. The company was working a fine body of ore there when the water stopped work.

Drilling operations on the west slope of Rock hill, two miles southwest of Leadville, have demonstrated that the main ore-bearing horizon exists in that locality. It was supposed that the sedimentary rocks, including the limestone contracts, had been eroded and that with them had been removed the possibilities of finding ore. After passing through 400 ft. of lake beds, the white porphyry was cut by the drill and at 680 ft. the 'blue lime' was encountered. At the contact ore matter was found; although the assays are low, the fact remains that the existence of the Leadville ore horizon has been demonstrated in a part of the district where it had been unproved, if not unsuspected.

San Francisco. Apr. 6.

(From Our Special Correspondent.)

The Supreme Court has sustained the lower court of Los Angeles county in a matter which will interest people owning land on which oil is found. The defendant obtained a lease of certain lands from the plaintiff, who resides in Mississippi, representing that he wanted to erect a tenement house thereon, and concealing the fact that the land was oil-bearing. When the plaintiff discovered that the defendant had been taking oil from the lands she served notice of the recision of the lease and began action for damages. The lower court gave her damages to the amount of oil taken from the premises, and the defendants lose their time and $6,750 for cost of plant.

It is well for miners to be careful when bargaining about prospecting on private lands to find out exactly to whom the land belongs. A case is now on trial in Mariposa county, where W. H. Nosser sues Hugo Barrett and his wife. By an agreement the plaintiff was permitted to enter upon the land of defendants and prospect for gold, it being understood that in the event of a discovery the plaintiff was to receive a deed to one-half undivided interest in the mine. He claims that within the time limit he discovered a gold-bearing ledge of enough value to warrant sinking two shafts upon it, but that the defendant, Hugo Barrett, has refused to execute a deed. The plaintiff has since learned that Emma Barrett was and is the owner of the land; that she knew plaintiff was prospecting on it and that her husband was acting as her agent. Nosser sues to compel issuance of a deed to him of half the mine.

The Government has asked for a restraining order against the Mountain Copper Co., Shasta county, for doing alleged damage to trees in a forest reserve, but now withdraws its petition for a temporary injunction and signifies willingness to allow the matter to be determined on its merits. An injunction would close the smelters during a long trial. Several Government experts have already reported that no material damage was being done to the timber on Government land. The company has bought thousands of acres of adjacent lands, most of it of little value, to avoid possible litigation, and the forest reserve is many miles distant from the smelters. A trial on the merits of the case may result in a decision which will stop further annoyance of the company.

Advices from Salt Lake state that engineering work has been stopped at that end on the railroad line which was to run to San Francisco by way of Beckwith pass, Plumas county, this State, because some amicable agreement has been reached between Gould, the Harriman and the Santa Fe lines. It is more probable, however, that the cessation of work is temporary and due to wet weather. The projected road runs from San Francisco through Nevada to Salt Lake. In some parts of the Sierra region where this line is to pass mines still pack in supplies and a railroad will open up a large amount of ground. Rights of way clear to San Francisco bay have already been secured.

The Gardiner, Worthen & Goss Co., of Tucson, Ariz., has written the State mineralogist that the results obtained of a 30-ton water-jacket copper furnace using crude California oil to smelt copper ores were so successful that a 250-ton furnace is to be tried. The patentee of the process is Mr. William Kemp, and his furnace is very similar to one using coke. The manager at Tucson writes that raw sulphide ores can be charged direct into the furnace, yielding a reasonably high grade matte from an ore that carried 30% sulphur and 4% copper by using 7½ gal. of crude oil per ton of ore, but this ore was self fluxing. On an ore carrying 12% copper and 28% sulphur they used 12 gal. of crude oil per ton of charge, iron and lime being added to the ore. The letter says that the company has demonstrated that oil can be used in a water jacket type of furnace using blast pressure. The furnace now under construction will be tried in the Vermont copper region, on mines already developed, the ores running 4% copper and about 30% sulphur, and practically self-fluxing. If the furnace proves a success it will mean a revolution in smelting, especially where crude oil is cheap, as in California. Carbonate ores, oxide ores and iron ores are yet to be tried in this furnace, but the parties interested believe such ores can be smelted as well as the sulphides by adding some coke or charcoal to get a reducing action. B. L. Worthen is manager of the company.

The trust controlling the lime quarries of this State has met defeat in a case where a master plasterer had agreed to buy only from the company for one year. The trust tried to get an injunction to prevent him from buying elsewhere, but he stated that he was forced to sign this contract by reason of a compact between the trust and the Contracting Plasterers' Association. It was shown on the trial that the plasterer was given a special price of $1.25 per barrel, while it was not denied that the cost to the company was not above 75 or 80c. The judge ruled that the contract could not be enforced because it lacked mutuality of obligation, and denied the injunction.

Victoria. Apr. 5.

(From Our Special Correspondent.)

Rossland.—It is announced that the Velvet and the Portland, two adjoining properties near Rossland, owned by English companies now in liquidation, will shortly resume operations under the direction of William Thompson, general manager of the Rossland-Kootenay Co.

Nelson.—The British Columbia Standard Mining Co. is about to enlarge the carrying capacity of the aerial tramway from its Hunter V. mine, near Ymir, to about 200 tons daily. The Reliance Mining Co. has been organized in Nelson to acquire the May and Jennie group of claims, on Forty-nine creek, about nine miles from Nelson. Nearly 3,000 ft. of work have been done underground and a large quantity of gold ore opened.

Slocan.—The Kilo group of 28 mineral claims, on the North Fork of Lemon creek, is reported sold to a Helena, Mont., syndicate for $75,000, of which $25,000 have been paid and the balance is to be paid shortly. It is stated that in 1900 a half interest in the group was sold to Warner Miller and W. E. Spier, of New York, for $52,000, and that $40,000 was afterwards expended in doing about 3,000 ft. of de-

velopment, blocking out 19,000 tons of ore and leaving some 40 carloads of pay ore on the dump. The death of Mr. Spier tied up the property, and it was only lately that arrangements to purchase could be made with the administrator of his estate. In the Payne mine, in No. 8 tunnel, rich silver ore is reported, samples are stated to have assayed up to 840 oz. silver to the ton. The width of the high-grade shoot is given as 2 ft. The Ivanhoe, owned by the Minnesota Silver Co., now employs about 125 men in mine and mill. The mill is working two shifts and turning out high-grade silver-lead and zinc concentrates. The Enterprise, owned by the London & British Columbia Goldfields, Ltd., and leased to W. Koch, is to resume work after a month's suspension. A number of Slocan mines have sent large samples of rich silver ore to St. Louis for exhibition. The latest shippers were the Slocan Star, Sunset, Ivanhoe, Reco, and Payne.

Medellin. March 10.

(From Our Special Correspondent.)

A large amount of new work in alluvial mining is being done. About 25 miles below Medellin, on the Porce river, the Antioquia Gold Mining Co., of Los Angeles, Cal., is installing a big plant. This company owns 13,000 ft. of completed ditch, with two pipe lines, and will operate four hydraulic elevators. The machinery is all on the ground. Robert B. Taylor is manager. A few miles below, on the same river, the La Clara Placer & Mines Co., of Kansas City Mo., has an extensive property under the management of John T. O'Brien. Two hydraulic elevators are at work, and two more elevators and two dredges are to be added shortly. Immediately below is the Cortada mine, owned by the Consolidated Mining Co., of Boston. An elevator is installed and has begun work. Another Los Angeles company, under the management of John S. Johnston, has secured the Guadalupe mines on the Porce river, just below the famous Guadalupe falls, where there is a perpendicular drop of nearly 900 ft. An extensive plant of machinery has been shipped from New York. Two other American and one French company are working on the lower Porce, while the Cauca Valley Consolidated Mining Co., of Detroit, Mich., is doing extensive prospecting on the Cauca river. The manager of this company, Silas H. Wright, has been here for 20 years.

In Medellin there are a number of new manufacturing plants in course of construction. The Cerveceria Antioquena, with a capital of $150,000, is building a brewery with a capacity of 20,000 bbl. per year. Waldemar Frank is general manager. Beer is worth 50c. gold per bottle here. The Compania Antioquena de Tejidos, with a capital of $100,000, is building a large cotton mill. Cotton grows wild in many places and is of good grade. Both plants are operated by water power. At Caldas, a few miles above this city, where there is a factory for making glassware and crockery, a department for making bottles to supply the brewery is now being added.

London. Apr. 2.

(From Our Special Correspondent.)

Considerable interest has been aroused in connection with the future of the Red & White Rose Gold Mining Co., one of the Willoughby group of companies operating in Rhodesia, a short distance from Bulawayo. This mine was originally exploited in 1899 and in 1902 commenced milling operations. All went well for a time, though the amount recovered in the mill was not more than $12 a ton, with a subsequent extraction of rather over $2 a ton from the tailings. It soon became obvious that the grade of the ore was rapidly falling off and in July of last year the mill was shut down. Mr. F. C. Roberts, the consulting engineer, not caring to undertake any further exploratory work, resigned, and Mr. T. F. Van Wagener succeeded him. Mr. Van Wagener, after a thorough examination, gave his opinion that the exploratory work would have to take the form of looking for another mine underneath. He says that in nearly every mining district with which he is acquainted a barren zone is found at the water level, and therefore recommends that the main shaft shall be sunk 300 or 400 ft. lower, to a depth of 1,000 ft. Accordingly a scheme has been prepared for the undertaking of this work and some £10,000 are being raised to defray the cost. The mine is equipped with costly machinery and plant, a fact which makes it all the more desirable that the lower levels should be tested. Quite a number of Rhodesian mines have become exhausted in the same way as the Red & White Rose, and have been abandoned. People interested in Rhodesia are, therefore, watching the present operations at this mine very keenly.

There are symptoms once more of bear raids in the West Australian markets. A few weeks ago the Great Boulder Perseverance was the target, but Mr. Ralph Nicholls soon issued a comforting statement for the reassurance of shareholders. This week it has been the Oroya-Brownhill that has been the object of attack. Rumors were circulated that the ore was proving to be of much lower grade than was estimated by Bewick, Moreing & Co., the engineers. Inquiry into the matter showed that the rumor was not founded on an actual lie, but on the perversion of the truth. Some time ago the engineers gave particulars of certain veins averaging 2 oz. gold per ton, but in milling this ore they pursued the correct policy of mining with it some low grade ore, so that the actual milling returns were lower than the superficial observer expected. In the old days of West Australian mining, the mining of rich and poor ores was never resorted to, the richest being picked out so as to give a greater capital value to the mine. Those who disseminated the rumor this week probably never dreamt that there was any other way of doing things and judged the present managers of the Oroya-Brownhill by themselves. The firm has already extensive connections in West Australia, and is continually adding to its list of mines. Golden Horseshoe and South Kalgurli are latest to come under their management. The former is a Kaufman company and the latter a Frank Gardner company, and in both cases the transfer of management is a matter of no little importance. The firm has many critics in the city of London, but they are to be thanked for the services they have done in eliminating speculative management from the West Australian market.

One yearly report of the Rio Tinto Co. is much like another and the chief item of interest to the speculative investor is the average price obtained for the copper output. The report for 1903, just issued, shows that the average price was £58 3s. 1d., as compared with £52 11s. 5d. in 1902 and £66 19s. 8d. in 1901. The dividend on the ordinary shares is at the rate of 70%, as compared with 50% in 1902, 7.25% in 1901, 85% in 1900, and 80% in 1899. At the present time the price of copper is not the only cause for increased profit, for the bessemerizing plant recently established at the mines has conduced to economy, and the costs will be still further reduced when the refining is done on the spot instead of at South Wales.

Hitherto the working of the Elmore oil concentration process has been somewhat impeded in Canada by the import duty of 5c. a gallon levied on the lower grades of oil. As the loss of oil is approximately one gallon per ton of ore, the expense per ton of ore treated was increased by the duty. The company owning the Canadian patent, together with the licensees and the Rossland Board of Trade, petitioned the Dominion government with a view to obtaining a rebate on the duty. It has now been decided to remit the duty entirely and to place the oil used in the process on the free list. As the process is especially applicable to low-grade ores, it is obvious that even the smallest reduction in operating expenses is of considerable importance.

Melbourne. Mar. 8.

(From Our Special Correspondent.)

The gold yield of Victoria to March 1, this year, was 109,322 oz., as compared with 105,230 oz. during the corresponding period for 1903. The improvement is somewhat inexplicable owing to the closing of several mines, but as the returns come from the mint there can be no doubt about them. The producing mines at Bendigo at present are the mainstay of the colony, but it is hoped that when Messrs. Bewick, Moreing & Co. get their properties in full swing, alluvial mines will regain their old ascendency.

The Spring Hills Leads mine on the famous Berry lead is chiefly remarkable for the ill-luck that has pursued it. The portion of the lead within the greater part of its ground proved to have been simply blotted out by a subsidence ages ago. In this hollow a large lacustrine deposit has been formed and the greater part of £80,000 has gone in the vain endeavor to pick up the lead. The company appeared to have got outside the disturbed region when it again struck the deposit, and now the whole of the extensive workings are flooded, the water being 98 ft. up the shaft. Months of pumping will be required to get the water out while not a penny is coming from the mine. The people who should derive advantage from this work will be the Berry United, adjoining, in which Messrs. Bewick, Moreing & Co. have a commanding interest.

All the New Moon stocks at Bendigo have had a flutter in consequence of the striking of rich ore in the Clarence mine at 980 ft., and the cutting of an ore body at a depth of over 2,200 ft. in the adjoining South New Moon. The latter is the premier mine in the State.

A great deal of scepticism has been shown by old-fashioned miners as to the cheapness of the pumping at Charlotte Plains by American electrically-driven three-throw pumps installed there, and the directors have published a statement of costs which has taken the wind out of the sails of the doubters. During the twelve months ending January 2 last, the company's New Havillah shaft pump raised a full head of water for 8,700 hours and 38 minutes, out of a possible 8,760 hours; and the Charlotte Plains pump lifted a full head of water for a few hours less, owing to a small repair. The water at the New Havillah mine is lifted 351 ft.; at the Charlotte Plains mine 346 ft. The fuel used is boxwood, 50 cu. ft. to the ton. During the year the two pumps lifted 2,160,837,967 gal. of water at a cost of 2,5995d. (say 5c.) per 1,000 Imperial gal., lifted 1,000 ft. vertically, or 42% cheaper than at the Chalk's No. 3, adjoining, where the best ordinary Cornish pump is in use. The actual cost at that mine was 4½ per 1,000 Imperial gal. lifted 1,000 ft. The fuel used was boxwood, costing 7s. per ton, or the same as is paid by the Charlotte Plains people. For every £2,100 expended by the Lord Harry Co. in pumping, using an old type of engine, Chalk's No. 3 had to spend but £700 for the same work, and now the Charlotte Plains Co. is doing exactly similar work for an expenditure of £406, easily establishing a record, both as to cost and quantity of water pumped in a given time.

Perth. Mar. 9.

(From Our Special Correspondent.)

Broken Hill Proprietary's half yearly report shows a gross profit of £91,999, an output of 2,462,776 oz. silver and 30,808 tons of lead. The ore raised totalled 283,282 tons, compared with 287,384 tons in previous half year. Work stopped three weeks during water famine. It is expected that the sulphuric acid plant (Carmichael-Bradford process) will be in operation at the end of March. The condensers are saving 77,000 gal. of water daily.

The Laverton and Erlistown districts, on the Mount Margaret gold fields, are giving great promise. The recent find in the Craigiemore is opening well. The Lancefield is erecting the new 40-head battery. Mr. A. E. Morgans, of the Westralia Mount Morgans, is securing some options at Duketown, North Erliston, where very good prospects are seen. The Mulga Queen Reward claim now has its own battery and has crushed 100 tons for 80 oz. gold. At Burtville, 20 miles south of Laverton, a parcel of 200 tons from the Savage Captain lease now going through the public battery will certainly yield over 5 oz. to the ton.

On the Murchison field some good alluvial is being obtained at Gullerva, from a wash 4 ft. thick. The Great Fingall Consolidated figures for January show working, development and capital costs to have been £20,581, leaving a profit for the month of £28,028.

Coolgardie.—The tributors of the famous Londonderry mine have struck good stone at the 275-ft. level.

Kalgoorlie—The Ivanhoe's main shaft is nearing 1,100 ft. and the main ore bodies are opening up well at all levels. Additions are to

be made to the Kalgoorlie's reduction plant. Further alterations at the Great Boulder Proprietary are waiting the return of Mr. R. Hamilton from London. The Associated Mines has made important developments at No. 10 level on the Australian goss lode, where an immense body of ore has been exposed,. averaging from 1 to 2 oz. gold per ton.

Kanowha District.—The White Feather main reef has been placed in the charge of Messrs. Bewick, Moreing & Co. Doyle's claim has crushed 17 tons for a yield of 203.9 oz. of gold; 3,000 oz. of gold have been obtained from this claim.

Leonora District—A very rich find has been made in the Lights of London. The reef at 40 ft. deep is 3 ft. 6 in. wide, and ore containing as high as 100 oz. of gold per ton is obtained. The old Waitekauri Co., near Mertondale, gave up operations and removed the crushing plant; New owners have recently struck splendid ore, obtaining over 400 oz. of gold from a few tons, and are now erecting a battery.

Murrin District.—The Anaconda copper mine has been let on tribute. The company recently got into serious difficulty by mismanagement, and the opening up at the 300-ft. level proved very unsatisfactory.

Sydney. Mar. 1.

(From Our Special Correspondent.)

South Australia.—Some development is taking place in mining in the Northern Territory. Over 500 oz. gold has been received from Pine Creek, and the crushing of 52 tons for 160 oz. has been announced.

Tasmania.—The Mount Lyell Smelting Co. for the month ending February 3, treated 30,955 tons of ore from Mount Lyell and North Lyell mines. The converters produced 595 tons of blister containing 587 tons copper, 6,476 oz. silver, and 1,520 oz. gold.

The Zeehan output for January was 3,405 tons, valued at £11,348.

The Zeehan Comstock open cut shows 14 ft. of blende, about one-third of which will run 48% of zinc.

The Briseis output for January was 37 tons, 7 cwts. black tin ore.

The Mount Lyell output is still very satisfactory, averaging 350 tons per day; 20% ore is obtained at the 300 and 400 ft. levels.

The copper ore at the Mt. Morgan mine is estimated to contain 3% copper and 6 dwt. gold per ton. It is possible that in the near future 15,000 tons will be treated per month. The January output was 9,524 oz. 16 dwt. gold from 19,370 tons ore; as well as this, 1,200 oz. of gold was extracted from 6,705 tons of old tailings and 21¾ of copper precipitates produced containing 81% copper.

The New Ravenswood during January crushed 1,660 tons for 2,047 oz. gold and 460 oz. from concentrates.

The Munganna mines during the first two weeks of February has sent to the smelters 248 tons copper ore and 533 tons of lead ore.

Broken Hill South Blocks reports 171 ft. of ore in latest development in southern workings.

British Broken Hill for second week in February treated 2,205 tons for 313 first and 108 second concentrates, giving 15% lead, 15.5% zinc and 9.9 oz. silver per ton. In north section the boring from 400 ft. level has proved only 2 ft. of ore in schist.

New South Wales.—At Broken Hill, the South mine in the last half yearly report estimates that the mine residue heap contains 497,181 tons of tailings, assaying 7.2% lead, 4.1 oz. silver per ton and 19.7% zinc; and also shines, 86,136 tons, assaying 14.7% lead, 6.3 oz. silver per ton and 18.4% zinc. The crude ore raised was 59,100 tons, and the silver and lead contents showed an increase.

Queensland.—Charters Towers mills during January treated 17,968.5 tons for 16,296 oz. gold, and the cyanide works 14,506 tons for 6,332 oz. Brilliant & St. George mine crushed 1,206 tons for 869 oz. gold and cyanide bullion worth £916. Queen's Cross Reef crushed 1,315 tons for 3,917 oz. gold, and the total February returns for this property were 2,650 tons crushed for 9,200 oz. gold.

The Central mine has ordered new machinery for zinc extraction.

TO ENGINEERS VISITING NEW YORK.

A room for the exclusive use of visiting mining engineers is maintained at the New York office of the ENGINEERING AND MINING JOURNAL. Visitors to the metropolis are cordially invited to take advantage of the facilities it offers, by having their mail addressed in care of the JOURNAL, and making this office their headquarters. The managers of the branch offices will also be glad to welcome visiting engineers and to be of any service to them that they can.

TO ENGINEERS VISITING LONDON.

We are informed that the Institution of Mining and Metallurgy offers to all members of the American Institute of Mining Engineers nonresident in Great Britain, the privilege of free use of the Institution offices and library in Salisbury House, London Wall, E. C. Visiting engineers may have their letters addressed to the offices of the Institution, and thus enjoy the advantages of temporary office accommodation in the city of London.

PERSONAL.

Mining and metallurgical engineers are invited to keep the Engineering and Mining Journal informed of their movements and appointments.

Mr. Robt. T. Hill has returned to New York from Arizona.

Mr. Otto Sussman is visiting the mines and smelters at Leadville, Colorado.

Mr. Francis L. Bosqui has returned to San Francisco from Goldfield, Nevada.

Mr. Charles Butters recently visited Tonopah, Nev., and the surrounding districts.

Mr. J. M. Meighan, of San Francisco, is inspecting properties at Tonopah, Nevada.

Mr. M. J. Cartan, of St. Louis, is visiting New York, having come here from Mexico.

Mr. William A. Farish has returned to Denver after several weeks' absence in New York.

Mr. F. C. Mandell, manager of the Alturas Mining Co., at Blaine, Idaho, is now in New York.

Mr. Arthur S. Dwight is now general manager of the Greene Consolidated Co. at Cananea, Mexico.

Mr. F. D. Weeks, of the Engineering Co. of America, has gone to Colorado on professional business.

Mr. J. W. Stearns returned from Europe on the *Celtic* and left New York for Denver on April 14.

Mr. Robert M. Brereton, of Portland, Ore., is inspecting Tonopah and the adjacent districts in Nevada.

Mr. R. J. Frecheville arrived from London by the *Celtic* and left New York for Colorado on April 13.

Mr. Jas. Roberts has returned to England from the Appankran Consolidated Mines in West Africa.

Mr. Henry E. Crawford, of the Engineering Co. of America, is examining coal and iron properties in Virginia.

Mr. Jay P. Graves, of Phoenix, B. C., general manager of the Granby Co., has been at Montreal, Quebec.

Mr. W. H. Weed, of the United States Geological Survey, has returned to Washington, D. C., from Panama.

Mr. P. L. Williams, Jr., superintendent of the Highland Boy property, Bingham, Utah, left for California recently.

Mr. Thos. H. Leggett, on his return from California, sailed for London by the *Kaiser Wilhelm II.* on April 11.

Mr. T. H. Oxnam, on his way from the Palmarejo mines, in Mexico, sailed for London by the *Teutonic* on April 13.

Mr. J. C. Ralston, of Spokane, Wash., who is now engaged in Nevada and California, was in Salt Lake City recently.

Mr. Richard F. Stretch is consulting engineer to the Montezuma Mining Co., Montezuma, Esmeralda county, Nevada.

Mr. J. Hays Hammond has returned from Mexico to Colorado, on visits of inspection to Cripple Creek and Ouray.

Mr. Arthur Winslow, general manager of the Liberty Bell Gold Mining Co., of Telluride, Colo., was at Denver recently.

Mr. C. W. Wheelock, general manager of the Engineering Co. of America, is spending a few days at Toronto, Canada.

Mr. George E. Metz, of New York City, will have direction of affairs of the Shawmut-Nevada Gold Mining Co., Fay, Nevada.

Mr. H. W. Turner, late of the United States Geological Survey, is inspecting properties at Ray, Tonopah and Goldfield, Nevada.

Mr. John H. Mackenzie has assumed charge of the Le Roi property at Rossland, B. C., pending the recovery of Mr. S. F. Parrish.

Mr. T. James, of Spokane, Wash., has resigned as consulting engineer to the Salmon River Mining Co., near Conconully, Washington.

Theodore J. Hoover was appointed superintendent of the Standard Consolidated Mining Co.'s mines at Bodie, California, beginning April 1.

Mr. W. S. Thyng, of Spokane, Wash, was recently in Osceola, White Pine county, Nev., examining the property of the Tungsten Mining Company.

Mr. Charles F. Spaulding and Mr. Joseph P. Labaw, mining engineers, have formed a partnership and have opened an office at Salt Lake City, Utah.

Mr. F. H. Flood, formerly at Kennedy, Nev., has been appointed superintendent of the mill and cyanide plant at the Bodie mine, at Curlew, Washington.

Mr. Joseph Hyde Pratt, of the Engineering Co. of America, returned to New York recently from the West and has gone to Chapel Hill, North Carolina.

Mr. John F. Holden, formerly manager of the Venus mine, Nelson, B. C., is in charge of the Coronado Gold Mining Co.'s property at Congress, Arizona.

Mr. Robert B. Stanton, who represents the United Mining & Development Co., at Leadville, Colo., is visiting New York for the purchase of additional machinery.

Mr. J. T. Morrow has resigned as general manager of the Cananea Consolidated Copper Co.'s mines and works and entered into partnership with Mr. W. C. Greene in a number of mining enterprises. Mr. Morrow is now in New York.

Mr. Ernst J. Lederle, recently health commissioner of the city of New York, has opened laboratories at 518 Fifth avenue, New York, for sanitary, chemical and bacteriological investigations, particular supervision of public and private water supplies, drainage, sewerage disposal, etc.

SOCIETIES AND TECHNICAL SCHOOLS.

UNIVERSITY OF CALIFORNIA.—About forty students of the mining department are visiting Grass Valley and Nevada City, where they will have every opportunity to examine the gold mines and milling plants. The large companies of the State now employ a number of graduates of the university in various capacities.

MONTANA SOCIETY OF ENGINEERS.—At the meeting on March 12 Mr. Frank S. Mitchell was unanimously elected to membership. The privileges of the society rooms was granted to the Brooklyn Engineers' Club. The secretary read an invitation to the members to attend an International Engineering Congress to be held at St. Louis, Mo., October 3 to 8, under the auspices of the American Society of Civil Engineers.

INDUSTRIAL.

Dewey & Lockhart, of Guadalajara, Mexico, which concern lately purchased the Soledad mining property, in the vicinity of Mecca, State of Jalisco, will erect a large concentrating mill.

The Semet-Solvay by-product ovens of the Milwaukee Coke & Gas Co., Milwaukee, Wis., were put in operation recently. Forty ovens are in use and 40 more will be completed shortly.

Construction has just been finished on the first blast furnace at Pretoria, South Africa. The furnace will have a weekly capacity of 500 tons of pig iron. The ore found near the blast furnace is said to run from 58 to 62% iron.

The Kenton Machine Works, Kenton, Ohio, will soon erect a building for the manufacture of gas and gasoline engines, equip it with traveling cranes and install its own electric lighting plant. Considerable new machinery will be required.

The Allis-Chalmers Co. has acquired the Norwood foundry of the Bollmann-Wilson Foundry Co. at a reported price of $100,000. This foundry made many of the castings for the Bullock Electric Co., which was recently absorbed by the Allis-Chalmers Co.

The Midvale Steel Co., Nicetown, Philadelphia, is preparing to build a tempering plant which will include a main building 504 by 689 ft.; a furnace shed 432 by 68 ft., and a gas house 378 by 32 ft. Work will also begin shortly on an open hearth building 231 by 188 ft.

The Pencoyd plant of the American Bridge Co. has 100 men preparing for a resumption of operations. The recent fires in Baltimore and Rochester are held responsible for large orders of iron and steel which have been received by the American Bridge Co. When working full blast the plant will employ about 3,000 men.

The Snoqualmie Falls & White River Power Co., Seattle, Wash., with $3,000,000, has acquired the property and business of the Snoqualmie Falls Power Co., White River Power Co., Seattle Cataract Co. and Tacoma Cataract Co. The new company will complete the development of the water power of White river along the plans already outlined. About 60,000 h. p. will be developed, but the initial installation will be for 10,000 h. p.

The Crocker-Wheeler Co., manufacturers and electrical engineers, of Ampere, N. J., has doubled its capitaliziaton. The company was organized in 1892 by Dr. Schuyler Skaats Wheeler and Prof. Francis B. Crocker. It now has 15 branch offices from Boston to San Francisco and does one of the largest businesses in the world in electric power apparatus. The capitalization in 1899 was $1,000,000. In view of the rapidly expanding business the stockholders have now decided to increase it to $2,000,000.

The San Carlos Copper Co. is reported to have let a contract for the construction of a 40-mile railroad to run from Linares on the Monterey division of the Mexican Central Railroad, to the San Jose mines. The contractors figure that the roadbed will be completed in about nine months. The line will run direct from Linares to the San Carlos Co.'s mines at San Jose and will be operated under a Federal concession which gives the owners the right to extend the line to the Mexican gulf. Passenger trains as well as freight will be run.

The Sullivan Machinery Co., through their Denver, Colo., branch, recently sold one 12 by 30 Corliss geared, double-drum hoisting plant and one 16 by 16 by 10 by 16 compressor to the Santa Eulalia Exploration Co., Chihuahua, Mexico; one 17 by 42 first-motion, single-drum Corliss hoist to the Calumet & Arizona Development Co., Bisbee, Ariz.; one 17 by 42 double-drum, first-motion Corliss hoist to the Calumet & Pittsburg Mining Co., Bisbee, Ariz.; and three 20 by 22 by 14 by 24 compressors to Jas. Degnan & Co., Wilburton, Indian Territory.

The Baldwin Locomotive Works during March received orders for 67 locomotives for the Pittsburg, Carnegie & Western road of the Wabash system, 45 of which will be of the Mogul type, 12 of the Atlantic type and the remainder switching engines. Thirteen locomotives were ordered by the Atlantic & Birmingham Railroad; these are simple 10-wheel engines. The Southern Railway ordered 25, and the Atlantic Coast Line 12 locomotives. Several orders of engines for export have been booked. O. D. Colvin, former manager of the American Steel and Wire Co. at Seattle, is manager.

The Sirocco Engineering Co., of New York, reports that it is installing at the Pennsylvania Railroad's shops at Altoona, Pa., two Sirocco fans for cupola work to handle air against a 21-in. water gauge, is figuring on fans for forced draught for the Interborough Co., New York, and is to furnish eight fans for the Thirty-second street power house of the New York Edison Electric Co. The company has also received recently an inquiry for two ventilating fans to handle 136,000 cu. ft. of free air each per minute against 4.5 in. water gauge for the Washington tunnel of the Pennsylvania Railroad.

The Mexican Light & Power Co., Ltd., with New York offices at 29 Broadway, is reported to have decided to supply energy from its Necaxa plant to mines at El Oro. The length of the line will be nearly 175 miles. For the Necaxa plant 45,000 h. p. of equipment has already been ordered. The turbines will be built by a Swiss engineering firm of Zurich. Siemens & Halske, of Berlin, will make the generators. The General Electric Co. will manufacture the transformers. The plant will transmit current 100 miles to Mexico City for general power purposes. The ultimate capacity of the Necaxa plant will be about 80,000 h. p.

Since the removal of the foundry and pattern departments from the B. F. Sturtevant Co.'s plant at Jamaica Plain to Hyde Park, Mass., the fan, heater and electrical departments have been moved. The engine and galvanized iron departments are in process of removal and the erection of the machines in the machine-shop is well under way. These machines, as well as all the others throughout the works, will be of the most improved type and with the systems of cranes and industrial railways will enable the work to be turned out accurately, rapidly and at a minimum cost. The handsome office building is nearing completion. The headquarters are still at Jamaica Plain, but in a few months the entire plant will be moved.

TRADE CATALOGUES.

Ore and coal cars, wheels of all kinds and steel wheel-barrows are set forth in a recent catalogue of the Archer Iron Works, of Chicago, Ill. The publication is profusely illustrated, showing clearly the style and construction of the articles mentioned, with other specifications and prices.

Marsh tank and vacuum pumps are the subjects of catalogue 11, section 2, published by the American Steam Pump Co., of Battle Creek, Mich. The booklet, after setting forth the advantages and adaptation of the pumps, gives a number of tables of the details and sizes of the different styles, with illustrations of the same.

The A. Leschen & Sons Rope Co., of St. Louis, Mo., is distributing to its customers a neat little rope gauge or caliper made of celluloid, and a size that can be conveniently carried in one's vest pocket. The gauge will be found a handy thing for any one who uses or deals in wire rope. The company will send it to anybody who may have occasion to use such a device.

An immense 750-page catalogue of machine tools is being presented to the trade by the Niles-Bement-Pond Co., of New York. Six full-page illustrations of the various works of the company, followed by 13 pages of medals and diplomas awarded the various constituent companies of this concern fill the opening pages. Following this flattering introduction, arranged in a cleverly consistent manner, are found, first, machines for railroad shop use, embellished with 14 full-page illustrations, showing lathes from 51-in. to 100-in. swing; succeeding this division in the order named are the planers, milling machines, drills, boring and turning mills, boiler shop machinery and miscellaneous machinery. All divisions are well illustrated and metric as well as English measurements are given. The catalogue, which is 9 by 12 in., is hardly meant for general distribution, but will be sent on request to all users of the lines mentioned.

GENERAL MINING NEWS.

Mineral Oil Exports.—In March the United States exported 67,591,841 gal., divided as follows: Crude oil, 5,107,602 gal.; naphthas, 1,935,915 gal.; illuminating, 53,997,834 gal.; lubricating and paraffin, 5,904,194 gal.; residuum, 646,296 gal. For the three months this year the exports totalled 208,812,423 gal., which, compared with 1903, shows an increase of 19,670,133 gal., or 10.4%, principally in illuminating oil.

Chesapeake & Ohio Railway Co.—Shipments of coal and coke in February and the eight months of the fiscal year beginning July 1, 1903, were, in short tons, as below:

	February.	Eight months.
Coal:		
New River	330,266	2,269,540
Kanawha	185,853	1,371,883
Kentucky	10,608	107,799
	526,727	3,749,222
From connections	13,242	127,809
Totals	539,969	3,877,031
Coke:		
New River	22,064	203,810
Kanawha	2,221	29,618
	24,285	233,428
From connections	.....	150
Totals	24,285	233,578

Shipments show a substantial increase, particularly in coal for western points.

ARIZONA.

COCHISE COUNTY.

(From Our Special Correspondent.)

Bisbee West.—It is reported that the 22 claims of this company have been bonded to Eastern men for 60 days. There are three shafts, 560, 740 and 70 ft., respectively. An ore body recently found in the 70-ft. shaft is said to be 15 ft. wide. This property is between the Red Jacket and Bisbee. The bond is reported to be for $2,500,000.

Copper Queen.—At Douglas two of the company's furnaces are in operation and two others will soon blow in. It is found that a large part of the old slag-dump is rich enough to be re-smelted and a carload a day is sent to the new smelters at Douglas.

Tombstone Consolidated Mines Co.—The main shaft is now down 754 ft. The face of the west drift on the 700 ft. is in 212 ft. and less than 80 ft. from a point below a winze from the 600 ft. The water is steadily falling, the pump throwing 2,300,000 gal. daily.

MOHAVE COUNTY.

(From Our Special Correspondent.)

Altata.—This mine, at Chloride, has rich silver ore in the 250-ft. level. Drills will shortly be used.

Minnesota & Arizona Gold Mining Co.—This company, controlling claims in Gold Basin, has completed a 30-ton cyanide plant and will treat 5,000 tons of tailings.

Minnesota.—The new Elspass mill recently installed at this mine near Chloride is saving the values satisfactorily.

Rhine Gold Mining Co.—This company, at Acme has its steam hoist working and is sinking the new shaft with three shifts of men in ledge matter worth $11.65 gold per ton.

Telegraph.—J. P. Wallace, working this gold property on Burno creek, has men running a crosscut at the 350-ft. level to open a run vein.

PIMA COUNTY.

(From An Occasional Correspondent.)

Imperial Copper Co.—This company is hastening the construction of the railroad which will connect its mine at Silver Belle with the Southern Pacific. About 10 miles have been graded, and it is expected that the road will be in operation the coming summer. A large body of high-grade sulphide ore has been opened from which shipments will be made to Douglas.

YAVAPAI COUNTY.

(From An Occasional Correspondent.)

American Copper Co.—This company at Blanchard will add six more 50-ton tanks to its cyanide plant and increase the capacity of the stamp mill. The present power plant is to be supplanted by a 100-h. p. gasoline engine which will drive a 75-kw. generator, it being intended to use electricity entirely in the mill.

Congress.—Development work is being carried on at this mine on the deeper levels and also in the Queen shaft which is furnishing good ore. The deepest shaft is now below the 3,800-ft. level.

Val Verde Smelter.—This plant, which has been in operation for two years as a custom smelter, has been purchased by the Bradshaw

Mountain Mining & Smelting Co. It will continue to treat custom ores, although operated in connection with the Copper Cobre mine.

CALIFORNIA.

AMADOR COUNTY.

The Kennedy, Zeila, Oneida and Argonaut mining companies at Jackson are now employing 600 men, the largest number at one time since quartz mines were opened there.

Bunker Hill Mining Co.—The first clean up of the new 20-stamp mill of this mine, at Amador City, ran a little over $6 per ton. The ore was mainly from the 1,200-ft. level and was not of as good grade as that on the 800 and 1,400 ft. levels.

Climax.—At this mine they have recently uncovered a good ledge of fair grade rock.

Zeila Mining Co.—The underground men have been temporarily laid off and stamps hung up at this mine, at Jackson, owing to the influx of water.

CALAVERAS COUNTY.

Jones.—A $4,000 pocket was recently found at this mine near Angels.

ELDORADO COUNTY.

Eldorado Copper Mining Co.—In the Ford mine belonging to this company at Georgetown, W. E. Everson, superintendent, the ledge has been struck showing some high-grade copper ore.

INYO COUNTY.

Millspaugh Mining & Milling Co.—The new 10-stamp mill of this company at Ballarat is working.

KERN COUNTY.

Hamilton.—The clean up of the Hamilton mill at Rosamond showed the ore yielded $60 per ton.

King Solomon.—The Ashford Mining Co. has leased this mine at Randsburg to Jones & Summers, who have begun work.

Magpie.—This mine at Randsburg has been leased by W. H. Nelson and Geo. Phillips, who have begun work.

Milwaukee Mining Co.—This company at Rosamond has completed its new 10-stamp mill, which has power, etc., for 20 stamps.

NEVADA COUNTY.

Banner.—It is reported that J. F. Littlefield will put up a new hoist on this gravel mine on Canada Hill.

Continental Gold & Copper Co.—This company has been organized to open certain copper deposits west of Grass Valley and to reopen the old Badger gold mine at that place.

North Star Mining Co.—This company at Grass Valley, A. D. Foote, superintendent, has about completed its new cyanide plant which is arranged to take material from 10 of the 40 stamps of the mill. The new variable speed reduction motor is attached to the five-throw pump on the 1,400-ft. level, which will lift 800 gal. a minute 600 ft. vertically.

Quartz Quarry Mining Co.—This company at North San Juan has a large body of ore and intends putting up a 10-stamp mill.

Sultana Mining Co.—Deeds have been given to this company for all the property of the Green Mountain Co. in Grass Valley. The new company has the following directors: J. M. O'Brien, J. J. O'Brien, E. Schwab, W. C. Webb, W. S. Downing, E. B. Lillis and J. Garity, all of San Francisco. J. M. O'Brien recently became sole owner of these claims after foreclosing on the Grass Valley Consolidated Co.'s property.

PLACER COUNTY.

Reed.—At this mine, adjoining the St. Lawrence at Ophir, $1,800 was realized from a 20-ton crushing.

Three Stars.—This quartz mine at Ophir has been sold by W. E. Dean, of San Francisco, to E. H. Vance, of Oakland. B. F. Hartley is to take the place of E. J. Kendall as superintendent, and heavier machinery put in.

SACRAMENTO COUNTY.

Folsom Development Co.—This company, above Folsom, has decided to put in a new dredge and intends building two more dredges.

SAN BERNARDINO COUNTY.

B. Gaylord & Son, of Los Angeles, have bought a group of copper prospects near the old Ibex mine, near Manvel, and have put 20 men on development work. A double compartment shaft will be put down 500 ft.

Chase, Roosevelt and Bagdad.—The mills of these companies at Bagdad have been started and the mines are employing 155 men. The force is shortly to be doubled.

Fearnot Mining & Milling Co.—R. E. Olds, of Detroit, has bought a controlling interest in this mine at Victor, and a 50-ton plant is to be put in. C. P. B. Bartlett will be superintendent.

Gold Pin.—At this mine at Victor a five-stamp mill is being put up.

SAN DIEGO COUNTY.

Free Gold Mining Co.—The Superior Court has decided that this property at Hedges, known as the Golden Cross, shall be turned over to the company on May 1. C. W. Pauley has been receiver for some years.

SIERRA COUNTY.

Mabel Mertz.—A 10-ft. ledge has been struck in this mine above Forest City.

SISKIYOU COUNTY.

Johnson.—This mine at Oro Fino, idle for the past 15 years, has been bonded to the Medina Mining Co., and when weather permits will commence sinking the shaft from the 400-ft. level. A 10-stamp mill and the Barker ditch are included in the sale.

McKinley.—This quartz mine at the mouth of Humbug is employing 40 men getting out quartz. Development work shows more ore.

Summerville.—This hydraulic mine at Cecilville is running with a full head of water and 12 men are at work.

STANISLAUS COUNTY.

Martel Mining Co.—A. F. Martel, of San Francisco, is one of the principal owners. The mines are in the Red mountain district, near Alameda and Santa Clara counties.

TRINITY COUNTY.

Altabert Dredging Co.—This company, owning claims on the Trinity river above Trinity Center, G. W. Payne, manager, will shortly commence work again. Last year it worked three acres down to 15 ft. They own 700 acres of dredging ground.

La Grange Mining Co.—This hydraulic mining company, near Weaverville, has had some of its ditches badly washed out, retarding work.

TUOLUMNE COUNTY.

Bell.—In this mine at Tuttletown, owned by El Rico Mining Co., a 10-ft. vein of gold milling ore has been struck on the 600-ft. level. Work on the new mill will be resumed when the weather improves.

Black Oak Mining Co.—At this mine, Soulsbyville, the mill has started again. The mine has resumed under the old conditions, with both union and non-union miners at work.

Kanig.—The new mill at this mine is ready to start.

Mack.—It is reported that a 10-stamp mill is to be erected at this mine, Big Oak Flat.

COLORADO.

BOULDER COUNTY.

Quo Vadis Gold Mining Co.—The mine has recently been equipped with an 80-h. p. boiler, compressor and machine drills, and the crosscut tunnel is now being driven toward the Portland vein at the rate of 15 ft. a week. The company is capitalized at $300,000, divided into 60,000 shares, par value $5 each. The officers are: H. S. Halbert, president, Kansas City, Mo.; I. Moore, vice-president and superintendent, Boulder, Colo.; J. A. Brubaker, treasurer, Kansas City.

CLEAR CREEK COUNTY.

Clear Creek & Gilpin Mining & Tunnel Co.—The following officers and directors were chosen recently for the ensuing year: R. R. Moodie, of Greeley, president and general manager; Howard Ranck, of Idaho Springs, vice-president and superintendent; George K. Torrey, of Denver, treasurer and secretary. Directors—C. E. Balbach, of Omaha; George J. Bird, of Omaha; Judge J. E. Garrigues, of Boulder, and C. L. Carter, of Greeley. The company is preparing for the installation of a new power plant.

Gold Rock.—C. A. King and J. J. May have a lease on the dump at this mine and will run it through the mill at Idaho Springs. This property has not been worked for several years.

Home Leasing Co.—This company, near Idaho Springs, sends 30 tons of ore to the sampler daily.

Omar Gold Mining & Tunnel Co.—The holdings of this company are soon to be transferred to the Omar Consolidated Gold Mining & Tunnel Co. The capitalization of the new company will be the same as the old. The group now consists of 27 claims and a mill site in Hamlin gulch, in Gilpin and Clear Creek counties. The tunnel has been driven in on this group about 170 ft., and some 400 ft. of drifting have been done. James L. Lindsay is president of the new company, and H. Al Reidel, of Denver, secretary and treasurer.

Quito.—This mine, on Chicago creek, is being unwatered and will be worked this summer.

Tenth Legion.—This group near Idaho Springs, formerly owned by the Corncracker Co., was sold recently by L. Hanchett to the Empire Tunnel Co. for $12,000 cash.

Ward.—A new 60-h. p. engine is being installed at this mill.

CUSTER COUNTY.

(*From Our Special Correspondent.*)

A three years' lease has been given the Little Jim Mining & Leasing Co., of Pueblo, operatin the Hardscrabble district, near Querida, on 40 acres of the Aburdix Co.'s ground, covering the Elemetah, Jack Rabbit, Golden Fleece and Aburdix claims. The principal development consists of a 400-ft. shaft with drift at 200 ft., but a level will be started at the bottom, where, it is believed, an ore shoot has been discovered. R. L. Hafe is superintendent.

EL PASO COUNTY.

Henry Adney.—The Julia B. Mining Co., which holds this property, near Colorado Springs, under a $35,000 bond, is to install a 1,000-ft. hoist and a six-drill air compressor. A station is being cut at the 416-ft. level, and cross-cutting on the ore shoot continues. Michael Burke is manager of the company.

GUNNISON COUNTY.

A large reduction plant is to be erected at Vulcan, to treat the dumps of the Vulcan, Mammoth Chimney and Good Hope mines. S. C. Arnold, of Denver, manager of the Combined & Amalgamated Co., has leases on the dumps mentioned, and the remaining ore in the stopes, as well as the ore on the ground, for his plant to treat. The mill will be erected on ground owned by the Vulcan Townsite & Mining Co., on Cramp creek. Ore will be hauled to the mill on a gravity tram. The works will be a chemical reduction plant of 100 tons daily capacity.

LAKE COUNTY—LEADVILLE.

(*From Our Special Correspondent.*)

Benton Mining Co.—The Park lode owned by this company has been leased to J. J. Brown and others, who will do development work. This group includes 80 acres which Brown and his associates have bought outright.

Diamond.—This company is opening large deposits of fair grade material and shipping some 3,000 tons a month of fair grade ore.

Ibex Mining Co.—The company has resumed work on No. 4 at the 1,220 ft. level, where a new fissure vein carrying copper values has been disclosed. The other parts of the combination will soon be operated under leasing contract.

New Monarch Mining Co.—Shipments average about 3,500 tons a month and development is being pushed ahead. Six cars of new machinery to sink the Monarch shaft will be put in place when the weather permits. The Cleveland shaft, which encountered a sulphide ore body, is in ore and has passed through 200 feet.

Nil Desperandum.—The operators are at work on the Moffat shaft, and in the winze that is being sent down, it is learned that a good vein has been encountered.

Tenderfoot.—This property, on Little Ellen hill, near the Ollie Reed, is sinking a new shaft to tap the gold belt ore deposits.

Twin Lakes Placer Co.—Manager N. A. Loggin has returned from London, and is preparing for resumption on this ground, owned by English capitalists. They have over 1,700 acres and will do hydraulic work and considerable drifting. The returns last year were not satisfactory.

United Mining & Development Co.—This is an eastern syndicate working on West Rock hill, owned by Frank W. Owers. The company has put down a drill hole on the Mike claim, which shows the formation in place. Ten holes will be sunk.

Wadcaso Mining Co.—Extensive development work is being put under way. The shaft on the Eclipse claim is down 1,000 ft. and new machinery is being installed.

SUMMIT COUNTY.

Jessie Mining Co.—The 40-stamp mill of this company at Breckenridge, is running again after an idleness of two years. T. R. Griffith and associates took hold last December under a lease and bond, and have been retimbering the workings.

TELLER COUNTY—CRIPPLE CREEK.

(*From Our Special Correspondent.*)

A decision handed down by the Supreme Court is of great importance to owners of non-producing claims in the Cripple Creek district. Three test cases were brought against the commissioners of Teller county by the Pilgrim Consolidated Mining Co., the Hart Gold Mining Co. and the Moon Anchor Gold Mining Co., respectively, protesting against the board's right to tax non-producing mineral claims. The cases were dismissed by the Supreme Court for lack of jurisdiction, Justice Campbell saying that as a general thing mining property is valuable only for the ore it contains, and a productive mine has more value than one which yields nothing. When the general assembly, by the specific methods it provided, limited the valuation which an assessor can place upon a more valuable producing mine, the assessing officer may not, by employing the methods adapted to other real estate put a greater valuation upon a less valuable non-producing mine similarly situated to the former. It is believed the case will be taken up by the Court of Appeals at once. There are said to be over 100 companies interested.

Cripple Creek Portland Mining Co.—The Iowa Supreme Court has reversed the decision of the lower court against James F. Burns, president of the company, which gave James Doyle $449,992 with $8,000 interest and $8,000 costs. The suit was begun in 1898 by Doyle, who claimed payment for three claims that form part of the Portland property.

Dexter Co.—This company, on Bull hill, will build a cyanide mill to treat its $6 to $12 ore, of which it has a large quantity.

Doctor-Jack Pot.—Sinking on the Morning Glory shaft is now done on company account. The present depth is 700 ft., and the intention is to sink several hundred feet deeper.

Homestake Co.—This company, on Ironclad Hill, has decided to increase the capacity of the mill to 1,000 tons per day.

Twenty.—This mine on Grouse mountain, is to have a mill in the near future, and will drive the tunnel now 600 ft., 400 ft. more.

Vindicator Mining Co.—A dividend of $33,000 is payable April 25.

IDAHO.

IDAHO COUNTY.

American Eagle.—Judge Steele of Lewiston has appointed P. E. Stookey of Lewiston receiver of this property. The American Eagle is owned almost entirely by Spokane men. Debts amounting to $14,000 could not be met. A 10-stamp mill is on the property and considerable work has been done. E. Richter is president and C. K. Merriam is secretary and treasurer.

Cove.—Work has started on these placer mines, 11 miles south of Grangeville. Six miles of ditch were dug and 3,000 ft. of pipe, a tail race and flume put in. The property is low grade and covers about 200 acres. H. T. Weston is manager.

LEMHI COUNTY.

Gold Dust.—The 10-stamp mill on this property near Leesburg, is to be enlarged to 20 stamps. About 700 ft. of development work has been done, and a sawmill and blacksmith shop put up. Henry Harker is superintendent.

WASHINGTON COUNTY.

Iron Springs Mining & Milling Co.—This company, in Rapid river district, will install a milling plant this season, it is reported, and also a 200-ton cyanide plant. The company has completed an electric plant and the mines and mill will be lighted by electricity. C. F. Macey is superintendent.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

(*From Our Special Correspondent.*)

Atlantic.—The March production was 360.5 tons of mineral.

Baltic.—This mine produced 459 tons of mineral during 16 days in March. Rock shipments average 2,000 tons per day.

Calumet & Hecla.—The March production was approximately 3,200 tons of refined copper.

Champion.—This mine's output for 16 days in March was 475 tons of mineral. The stamp mill is treating an average of 1,400 tons of rock daily.

Franklin.—The March product was 323 tons of mineral. No. 2 shaft at the Junior branch is sinking below the fourth level and shows copper on the hanging side. No. 1 shaft is sinking below the 18th level. It is in the foot of the lode which looks well. A new stope started at the 16th level south is showing rich copper ground.

Isle Royale.—It is estimated that this mine produced 72.5 tons of refined copper in March.

Osceola Consolidated.—This mine's production in March was approximately 800 tons of refined copper.

Quincy.—The March output of this mine was 1,119.5 tons of mineral.

St. Mary's Mineral Land Co.—A fourth hole is being made with a diamond drill southwest of the Winona mine to cut the Winona amygdaloid for its entire width. A previous hole cut the lode for 6 ft. and the core revealed considerable copper.

Tamarack.—The March production is estimated at 600 tons of refined copper. Work has ceased in No. 2 shaft. Seventy single men were laid off and the married men given work in No. 1 and No. 3 shafts. Seven drills are at work on the Osceola amygdaloid lode through No. 1 shaft. Production from No. 2 will not be resumed until the timbering is repaired.

Trimountain.—The mineral production during 16 days in March amounted to 335 tons.

Winona.—The March product was 44 tons of mineral.

Wolverine.—This mine's output in March was 481 tons of mineral.

COPPER—KEWEENAW COUNTY.

(*From Our Special Correspondent.*)

Miskwabik.—The pumps are keeping the workings clear of water. Larger machinery is being installed.

Mohawk.—The output of this mine in March was 485.5 tons of mineral, the largest monthly product in its history. All three stamps at the mill are working and rock shipments increase.

Phoenix Consolidated.—This mine produced 139 tons of mineral in March.

COPPER—ONTONAGON COUNTY.

(*From Our Special Correspondent.*)

No. 3 shaft is sinking 95 ft. below the eighth level. The drift south on the eighth level in the Knowlton lode is in 115 ft. and shows good copper-bearing ground.

Adventure Consolidated.—The March product is estimated at 75 tons of refined copper. Rock shipments average 350 tons a day. The average yield per ton stamped is 17 lb. of refined copper.

Mass Consolidated.—This mine's output in March was approximately 105 tons of refined copper, half of which was secured from mass and barrel work.

Michigan.—The March production was 128.75 tons of mineral.

GOLD—MARQUETTE COUNTY.

(*From Our Special Correspondent.*)

Michigan.—The machinery at this property, controlled by the Tribullion Smelting & Development Co., has been overhauled and preparations made to begin work during the spring.

IRON—MENOMINEE RANGE.

Baltic.—A contract has been let to strip this mine at Stambaugh, owned by Pickards, Mather & Co. The stripping is estimated to involve about 25,000 yards.

Chapin.—The hydraulic works which furnish the power to run this mine of the United States Steel Corporation, at Iron Mountain, was put in operation recently, and the compressors have been set to work. This air compressing plant contains two duplex compressors with cylinders 32 by 60 in., one duplex compressor with cylinders 34 by 60 in., and one duplex compressor with cylinders 36 by 60 in. It is the intention later on to install an electric generating plant and transmit power to the other mines owned by this corporation on the Menominee range.

MONTANA.

DEER LODGE COUNTY.

(*From Our Special Correspondent.*)

French Gulch.—G. E. McNeill, who has been operating the Mollie Gibson dredge under a five-year lease, now expired, at Alder, belonging to the Conwey Placer Mining Co., is considering a proposition from the Daly estate to move the Gibson outfit to this ground. A Risdon dredge has worked there for three seasons and shown that a larger boat would prove profitable. The Risdon boat was placed there by W. R. Allen, of Anaconda.

JEFFERSON COUNTY.

(*From Our Special Correspondent.*)

Grey Eagle.—This property is under a lease to the people who are operating the Bullion mine, 10 miles above Basin. The ore is hauled to the new smelter at the mouth of Jack creek, just finished by the Cataract Copper Company.

Robert Emmet.—J. H. McCabe, who secured a bond for $20,000 with a working lease on this group, has continued work. It is proposed to retimber the old working shaft and sink 100 ft deeper. Machinery will be placed on the shaft at once.

MADISON COUNTY.

(*From Our Special Correspondent.*)

Surprise Mining Co.—A cyanide mill has been placed on the mine near Parrott. It is said that recent developments have exposed a good tonnage of ore amenable to the treatment.

SILVER BOW COUNTY.

(*From Our Special Correspondent.*)

Anaconda.—Some changes being made at the collar of the shaft necessitate a temporary lay off of the miners.

Boston & Montana Consolidated Copper & Silver Mining Co.—The annual meeting is to be held at the company's office in Butte, April 28.

Pittsburg & Montana Copper Co.—Shafts No. 2 and No. 3, 2,600 ft. apart, are to be connected on the 1,200 ft. level by a cross cut. Then No. 2 shaft will become the main working shaft. It is situated right at the new smelter of the company. The ore from it is delivered direct from the mine cars to the sampling mill. The smelter has had a preliminary trial run, which is claimed to have been satisfactory. The mines need further development in the way of connections between the two shafts and stopes before sufficient tonnage can be assured for the smelter.

NEVADA.

LINCOLN COUNTY.

(*From Our Special Correspondent.*)

Shawmut-Nevada Gold Mining & Milling Co.—The property comprises an area of 300 acres. The Horseshoe claim formerly belonged to A. W. McCune, of Salt Lake City, and was con-

siderably developed by him. Several fissures cut through porphyry and granite. The gangue rock is quartz-porphyry and spar and gold bearing. On the Snowflake is a very wide vein traceable for over a mile which is said to have sampled $7 per ton in gold. On the Horseshoe is a 12-ft. vein, developed by a 435-ft. incline, with drifts from the 100, 200, 300 and 400 ft. stations. A water supply for the mill was obtained at the 400-ft. level. Horseshoe ore is said to have milled $8.65 per ton. Two other veins on the Horseshoe have been considerably developed. On the Snowflake are some open cuts, one of which shows ore 70 ft. high and over 100 ft. wide. On the Amethyst is a 200-ft. shaft. The present mill treats 60 tons per day. Its capacity will be doubled. It has two crushers, two Chilean mills, Monadnock pattern, with amalgamating plates following each, the pulp passing from the latter by elevator to V-shaped settlers, the sands from which are leached by cyanide in the usual way. The slimes are further classified by a Coxe separator and leached in V-shaped boxes, the solution being pumped to a Coxe clarifier. The gold is precipitated by zinc dust. It is announced that G. Pray Smith is to retire from the management and that Geo. E. Metz will succeed him. Geo. E. Coxe is superintendent of mine and mill. The company contemplates erecting a large mill at the Snowflake, a mile from the Horseshoe.

NYE COUNTY.

(From Our Special Correspondent.)

Halifax Mining Co.—The main shaft is down 675 ft. The flow of water has increased to 85,000 gal. per day.

Tonopah Belmont Development Co.—At the annual meeting at Camden, N. J., March 21, the report presented showed considerable development work done. The ore on the dump was valued at $15,282, with large quantities opened on the 614 and 814 ft. levels. The sinking of the shaft on the eastern boundary has been suspended owing to water at a depth of 583 ft. John W. Brock, Philadelphia, was elected president; Arthur Brock, vice-president; Clyde A. Heller, secretary, and T. L. Oddie, of Tonopah, general manager.

Tonopah Mining, Milling & Development Co.—The 10-stamp mill has temporarily suspended to enable the management to add two Boss grinding pans, through which the pulp will pass after being ground by the Huntington mills. It is claimed that by grinding to greater fineness a higher extraction will be made, the pan amalgamation quickened and the capacity of the mill increased.

OREGON.

BAKER COUNTY.

Cracker-Oregon.—It is reported that a loan of $25,000 has been effected by the management of this property near Sumpter, which will be expended in development and improvements. A 20-stamp mill was erected last year, as well as a hoisting plant.

Scandia.—This tunnel in the Alamo district near Sumpter is in 2,700 ft.

Virginia.—This 10-stamp mill near Sumpter is completed.

GRANT COUNTY.

Bull of the Woods.—This property in the Susanville district, has been shut down owing to a disagreement among its owners. The pumps were pulled and the mine is full of water.

Blue Channel Placer Mining Co.—This company, working in the Susanville district, has put in two giants and 2,000 ft. of piping, as well as a steam hoist to raise gravel from underground drifts.

PENNSYLVANIA.

ANTHRACITE COAL.

Reading Co.—Contracts have been awarded by this company for 1,250-ft. shafts at Coal Castle and Eagle Hill and an 1,800-ft. shaft and 1,200-ft. tunnel at Brookside in lower Schuylkill county.

Saltsburg Coal Co.—This property in Conemaugh township, Indiana county, was sold for $280,000 to Alfred Hicks, of Pittsburg, at a foreclosure sale, the company having failed to meet a mortgage of $342,224.54 executed in 1884.

BITUMINOUS COAL.

Orient Coke Co.—This company, of Pittsburg, Julian Kennedy president, is reported to have sold to the Farmers' Deposit National Bank its entire bond issue of $700,000 first mortgage 5% 20-year bonds. The company owns 1,151 acres of coking coal land in the lower Connellsville region and has designed a coke plant of 500 ovens of which 300 are now under construction. The company is capitalized at $1,400,000.

LEHIGH COUNTY.

Eastern men recently purchased zinc producing property near Friedensville, adjoining the old Friedensville Zinc Co.'s mine. The property will be worked by open pits and machinery will be installed at once. The ore bodies are reported to be from 10 to 25 ft. thick.

SOUTH DAKOTA.

LAWRENCE COUNTY.

(From Our Special Correspondent.)

Clover Leaf Mining Co.—It has been decided to continue the main shaft, which will be sunk to 1,200 ft. The ore is improving with depth, and the water giving less trouble.

Golden Reward Mining Co.—Daily shipments of from two to five cars of ore are made to outside smelters.

Homestake Mining Co.—Cyanide plant No. 2, at the north end of the company's property, is receiving several new cone separators, and a new pipe line is being laid to convey the sands from the DeSmet stamp mill to the cyanide plant for retreatment. A streak of unusually rich ore has lately been encountered in the DeSmet mine. Cyanide plant No. 2 is also receiving larger vats, and its tankage is being increased 1,250 tons.

Imperial Gold Mining & Milling Co.—The 100 acres of mining claims in the Hugh McGovern estate have been purchased by this company for $100,000. The property adjoins the Horseshoe and Dakota companies, and large ore shoots have been worked by these companies to the boundary of the McGovern ground. By the sale to the Imperial all litigation ends. The ore will be shipped to the Imperial cyanide mill. It will be worked through old openings on the Horseshoe ground.

UTAH.

GRAND COUNTY.

(From Our Special Correspondent.)

Welch-Lofftus Rare Metals & Uranium Co.—This company has made a shipment of 30,000 lb. of ore to its reduction works built recently at Buffalo, New York.

IRON COUNTY.

(From Our Special Correspondent.)

Johnny Mine.—This mine is at Stateline. P. Sheahan is superintendent. The vein is crossed diagonally by rhyolite and andesite dikes. At the intersections are the strongest ore bodies. The ore generally averages 4 ft. in width, though some shoots are 16 ft. wide. The gangue consists of quartz-porphyry. The values are principally gold and silver. The main shaft is down 300 ft. and drifts have been run on the 200 and 300 levels, making 850 ft. of development on the vein. At a point 570 ft. west of the main shaft an incline has been sunk 240 ft. on the dip. Pumps on the third level and in the incline keep the mine clear of water and furnish more than is required for mill work.

The ore is dumped over a grizzly, thence goes to a McCulley crusher that reduces it to 1¼-inch. Two 5-stamp batteries, each stamp weighing 1,050 lbs., and dropping 6 in. 100 per minute, reduce the ore to pass a No. 9 diagonal slotted screen (equivalent to 40-mesh). Below each battery is an amalgamating plate in three sections. The recovery by the plates amounts to 70% of the gold, and a small per cent of the silver. The pulp passes from the plates through quicksilver traps to the cyanide leaching plant. The sands and slimes are separated by hydraulic sizers and are treated in separate vats. Lime is used to counteract acidity and aids in settling the slimes. The sands are leached 18 hours in a strong solution, then 48 hours in a weak solution. The slime tanks have cone-shaped bottoms, and the slimes, containing 50% moisture, are treated with cyanide solution, the contents of the vat being kept in motion by a centrifugal pump for two hours. The contents are then discharged into a wash tank, from which the gold solution is drawn off to the precipitating room. The values recovered in the slimes consist principally of silver. The consumption of cyanide amounts to 1¼ lbs. per ton of material handled. The total recovery is about 96% of the gold and 63% of the silver.

JUAB COUNTY.

(From Our Special Correspondent.)

Tintic Ore Shipments.—For the week ending April 8 shipments amounted to 119 carloads, as follows: Ajax, 3; Grand Central, 17; Mammoth, 3; Salvator, 2; La Clede, 1; Tintic Iron, 4; Bullion-Beck, 5; Gemini, 34; Centennial-Eureka, 40; Tetro, 3; Joe Bowers, 1; South Swansea, 1; Star Consolidated, 1; Lower Mammoth, 3.

SALT LAKE COUNTY.

(From Our Special Correspondent.)

Bingham Con. Smelter.—Copper bullion shipments for the week ending April 9 amounted to 184,892 lb.

United States Smelter.—A total of 250,508 lb. of copper bullion were produced during the week ending April 9.

Utah Con. Smelter.—Shipments of copper bullion for the week ending April 9 aggregated 302,255 lb.

SUMMIT COUNTY.

(From Our Special Correspondent.)

Park City Ore Shipments.—Shipments amounted to 3,023,000 lb. during the week ending April 9, as follows: Daly-West, 2,113,000 lb.; Ontario, 599,000 lb.; Keith-Kearns, 203,000 lb.; Woodside, 108,000 lb.

FOREIGN MINING NEWS.

CANADA.

BRITISH COLUMBIA—BOUNDARY DISTRICT.

Boundary Ore Shipments.—For the week ending April 2 shipments aggregated 16,902 tons, as follows: Granby, 11,850; Mother Lode, 4,224; Emma, 495; Oro Denoro, 333; total for the year to date, 216,047 tons.

Oro Denoro.—This mine did not ship week ending April 2 owing to the installation of new machinery.

BRITISH COLUMBIA—ROSSLAND DISTRICT.

Rossland Ore Shipments.—For the week ending April 2 shipments amounted to 7,712 tons, as follows: Le Roi, 5,152; Centre Star, 1,020; War Eagle, 690; Jumbo, 100; Le Roi No. 2, 650; White Bear, 100; total for the year to date, 118,091 tons.

Le Roi.—This mine at Rossland suspended shipments April 5 pending the resumption of the Northport smelter.

Le Roi No. 2.—The February report of Paul Couldrey, manager, is reported as follows: Estimated tonnage shipped for February is: Josie, 1,253 tons; No. 1 Mine, 470 tons. The net receipts, after deducting smelting charges, $21,457, from which have to be deducted mining expenses.

MEXICO.

CHIHUAHUA.

Juarez Co.—The 140-ton smelter and 100-ton concentrating plant of this company at Juarez near El Paso, Tex., was destroyed by fire March 29, entailing a loss between $125,000 and $150,000. The plant was erected in 1897. The Juarez Co. is a branch of the Corralitos Co. Britton Davis is president and general manager. The smelter was blown in in 1898, but in 1899 the company made a deal with the American Smelting & Refining Co. and the Juarez smelter was closed down. The concentrator started at the same time as the smelter and

run up to two months ago. The fire is thought to have been started by a locomotive spark.

SONORA.

Greene Consolidated Copper Co.—Messrs. John W. Gates and Anson W. Burchard have resigned as directors. Mr. Burchard was at one time second vice-president and comptroller of the company.

NEW ZEALAND.

Exports of gold in January were reported by the Mines Department at 29,217 oz. bullion, against 48,770 oz. in January, 1903; a decrease of 19,553 oz. The bulletin reported was equal to 25,867 oz. fine gold, or $534,662. The silver exported in January was 51,497 oz., against 62,343 oz. in January, 1903; a decrease of 10,846 oz. this year.

NEW CALEDONIA.

Exports of ores from New Caledonia for the year 1903 are reported by the *Bulletin du Commerce* of Noumen as below, in metric tons: Nickel ore, 77,360; Cobalt ore, 8,292; Chrome ore, 21,437. In addition to these exports, there were reported 9,845 kg. copper ore and 5,950 kg. lead ore during the year.

MINING STOCKS.

(Full quotations given on pages 628 and 629.)

April 13.

Amalgamated Copper has experienced an improvement, and on Friday last 80,900 shares changed hands at $51.50@$52.25, which is nearly four times the sales that have been reported daily during normal times. On Tuesday, April 11, transactions fell off considerably, and the price touched $50. Anaconda also showed larger dealings at $19.375@$20. Greene Consolidated, of Mexico, received more attention on curb, and touched $16.50, which is the highest price in some time. White Knob, of Idaho, strengthened to $8.75, but sales were comparatively small. British Columbia is lower at $1.75.

Thirty shares of Homestake Gold Mining Co., of South Dakota, were exchanged at $50, a price that will yield 6% in dividends per annum, as 25c. per share is declared monthly.

Colorado gold stocks are quiet. Portland, of Cripple Creek, brought $1.85, and Elkton Consolidated, 67@68c.

Ophir on the Comstock again surprised its stockholders with a 25c. dividend, making the fourth of the same amount this year, or a total of $100,800. This explains the high price for the stock this week, $5.625. Other Comstocks are uninteresting. Consolidated California & Virginia moved at $1.65@$1.75, and Union Consolidated at 86c.

Boston. April 12.

(*From Our Special Correspondent.*)

The interest has flattened out somewhat in mining shares in this market, although it is felt that it is but temporary. A broad and active market was witnessed last week, but moderate profit-taking caused reactions. Most stocks are lower to-night than a week back, but the better class of stocks show considerable resistance. The trading stocks are the ones which show the sharpest declines. Mohawk, on active buying, touched $44.25 and closes at $43, against $41 last week. It is felt that this mine will be classed among the high-grade ones at no distant date. Daly West, after stiffening to $28, has fallen back to $23.25, ex-dividend. Contrary to expectations, the regular 65c. dividend was declared payable April 15. The present decline is on selling due to the expectation that the next dividend will be 40c. The late activity in Centennial has flattened out and the stock closed at $20.87½. It touched $22.25 during the week. President Fay is now at the property and will institute changes as they may be needed. Copper Range touched $44.87½, but has fallen back to $43.25. The February exhibit of the railroad shows the effect of the strike and reflects the weather prevailing that month. Expenses were almost double those of a year ago. Tamarack touched $100.50; Wolverine, $74; Quincy, $89.50; Calumet & Hecla, $470, and all hold pretty close to these prices.

Dominion Coal spurted $6.50@$66.50, reacting $1. The buying was by Canadian interests, who are endeavoring to make a higher level. The local supply is limited. Dominion Iron & Steel also made a gain of $1.62½ to $10.62½.

Old Dominion mining has fallen back to $12.50. The warring factions have not come together yet in this property. President Smith, who has recently returned from the mine, states that there is a floating debt of $265,000, which may be allowed to accumulate to $300,000. The new smelting plant will cost close to $1,000,000. Bingham closes fractionally lower at $22.62½ and Osceola at $59. Allouez, over which there is some talk of a change in the management, is fractionally lower at $5. Parrot has lost $1 to $25, and Utah is quiet, close to $34. Sales of Ahmeek have been made on the curb at $20, Seneca at $15; St. Mary's Mineral Land at $35.50 and Boston Consolidated at $5.75.

Colorado Springs. April 8.

(*From Our Special Correspondent.*)

The market for Cripple Creek shares at the close of the week is still in an unsatisfactory condition, so far as the volume of business transacted is concerned. Prices, however, have held their own fairly well, which is a mitigating feature of the trading for the past few weeks. The production from the camp during the month of March reached the total of $1,750,000, approximately the amount of the output for February, so there is, in reality, no tangible reason for any decline in the quotations of Cripple Creek mining securities.

The latest measurements taken at the El Paso drainage tunnel show that more water is now being discharged from that bore than at any time since its completion, and the water level in the southeastern section of the camp is being lowered at the rate of 10 ft. per month. A number of leases have just been granted on the Stratton properties, and within a fortnight a small army of miners will be at work on different parts of the estate. The general condition of the district is excellent, and this fact should stimulate activity in mining stocks.

Salt Lake City. April 9.

(*From Our Special Correspondent.*)

The stocks sold on the floor of the Salt Lake Stock & Mining Exchange during the week brought $31,623, which was one of the lightest of the year. Butler-Liberal was called for and the stock was supplied at advanced figures. The company recently equipped its Bingham mine with a compressor plant and is preparing to market regular shipments of ore. Daly-West picked up during the week, but closed lower. The directors did not meet, as was expected they would, early in the week, so the secretary of the company posted the usual dividend of $117,000. Many thought if the directors came together the dividend would be cut. Grand Central found some demand, but holders of the stock are not in a selling mood at present. The South Swansea directors met on this date and posted a dividend of 1c. a share payable April 25, amounting to $3,000. Tetro dropped several points, it was quite generally expected that the directors would post a dividend at the meeting held on Wednesday, but the matter was passed until next meeting.

San Francisco. April 7.

(*From Our Special Correspondent.*)

In the Comstock shares some weakness has been manifested, and business was mainly at slightly lower rates. Chippers were very much in evidence in the market, and showed a disposition to sell short, which lid not prove the general tone.

Some quotations noted are: Ophir, $5.75; Mexican, $2.40@$2.45; Consolidated California & Virginia, $1.85@$1.90; Caledonia, $1.15; Sierra Nevada, 70@75c.; Hale & Norcross, 89c.; Gould & Curry, 42c.; Overman, 21c. per share.

On the San Francisco & Tonopah exchange business was rather quiet, and fluctuations in prices were slight. Montana Tonopah sold at $1.30@$1.35; Tonopah Belmont, 60c.; Little Tonopah, 25c.; Paymaster, 10c. per share.

On the California exchange business in oil stocks was of moderate dimensions, but prices were generally firm. Twenty-Eight sold at $6; Kern, $5; Home, $1.50; Monte Cristo, 80c.; Apollo, 45c.; Petroleum Center, 4c. The favorite stocks were Monte Cristo and Apollo.

The monthly record of sales on the California Stock and Oil exchange is as follows:

	Shares.	Value.
January	84,607	$31,389
February	96,677	45,556
March	194,630	126,559
Three months	375,914	$203,504

The March business was greater than that of the two earlier months combined.

COAL TRADE REVIEW.

New York, April 13.

ANTHRACITE.

The demand for anthracite is very heavy, particularly from New England, and a large tonnage is going forward. A preliminary estimate of the shipments from the mines in March is 3,820,000 tons; this compares with 5,211,548 tons last March, the falling off being no more than what was to be expected, since a year ago the effects of the great anthracite strike were felt by everyone. The output in April, while it may not be quite as large as last year, will be heavy. All companies have more orders on their hands than they can fill during the month and are endeavoring to get the miners to work more actively, increasing the daily tonnage mined by each man. The outlook is favorable for a free movement until July.

Trade in the Northwest is quiet, but coal-burning weather continues, and as navigation is not expected to open much before the middle of May, supplies on docks will be pretty well cleaned up. In Chicago territory there is a rush to get coal at the April discount, and railroad conditions have improved to such an extent that receipts of all-rail coal are fairly liberal. There is little prospect of any lake coal arriving this month. Along the lower lakes and in Canadian territory there is a good active demand for coal at April figures, and the volume of business is large. The weather at many places still calls for the use of an unseasonable amount of coal. Along the Atlantic seaboard demand is active at points beyond Cape Cod and along Long Island sound. All dealers have learned the advantage of putting in orders as early as possible, even though they may not be able to secure full advantage of April discounts, contenting themselves with the May and even June discounts. The average of prices of coal at New York harbor fell slightly during March from the level that had prevailed during the winter, but there seems no probability of there being any weakness at the new discounts, at least not for several months. Many vessels have been chartered for coastwise shipments and a large tonnage is afloat.

BITUMINOUS.

The Atlantic seaboard bituminous trade is steady and quiet. A heavy tonnage has been contracted for, and new contracts are closed every day. Transportation from mines to tidewater has improved considerably, and the chief annoyances at present are car supply, and vessel supply. There seems to be a combination of vessel owners and brokers to keep coastwise vessel freight rates on a basis of 80c. to Long Island sound ports and 90c. to ports beyond Cape Cod from the Virginia capes, with proportionate rates from ports to the North. These figures are apparently a little higher than the normal average at this season of the year, but what is most criticized, even by some of the vessel owners, are the loading and unloading requirement of the vessel association. It demands that vessels shall load and discharge within 8, 10 or 12 days, according to size. In many cases, this is plainly impossible. The time for 3,000-ton vessel, for instance, is 10 days, but it will take five days at some ports to load while there are very few ports at which a vessel of that size can discharge in five days. It would have been more reasonable to have put freight rates higher and given more time for discharging. Vessel owners also are criticized because they have endeavored to fix rates at a

time when there is a demand for anthracite tonnage.

In the far East considerable coal is arriving for first orders on new contracts. Along Long Island sound the market is quiet, anthracite receiving the attention of dealers. New York harbor is also quiet, heavy receipts recently having given consumers all they want. Ordinary grades of Clearfield are selling at $2.60@$2.65, f. o. b. New York harbor shipping port. The all-rail trade is quieter than it was and some small curtailments by consumers are reported.

Transportation from mines to tidewater is prompt, coal running through in five days. Car supply is slightly better than it was, but is still irregular; just now it is between 60 and 70% of the demand. In the coastwise vessel market vessels are in poor supply, but the demand is not great. We quote current rates from Philadelphia as follows: Boston and Portland, 75@80c.; Salem, 75@90c.; Portsmouth and Bath, 80@85c.; Lynn, Newburyport and Bangor, 90@95c.; Gloucester, 95c.@$1; Providence, New Bedford and Long Island sound, 70c.

Birmingham. April 11.

(From Our Special Correspondent.)

Announcement is made that, effective May 1, the United Mine Workers of America will have control of the Virginia City mines, in Jefferson county, where a strike has been on for more than a year and non-union labor has been working. The Alabama Steel & Wire Co. has leased the property to Amos Reid & Co., of Coalburg, Ala. The contract with the United Mine Workers has been signed to take effect May 1.

The Walker county coal operators, employing members of the Knights of Labor, have signed contracts for the ensuing year, effective April 1. The Galloway Coal & Coke Co., employing over 1,000 hands, will pay for forked coal 2½c. above the Jefferson county scale, which is based on the iron market. The Pittsburg Coal & Coke Co., owners and operators of mines at Corona, reduce their miners 10%, paying for forked coal heretofore 57½c. per ton. Similar rates are paid by other Walker county operators. The Sloss-Sheffield Steel & Iron Co. shut down its America mines in Walker county, but will give employment to the miners at other places in the coal bearing district.

An investigation of pig iron selling books on the part of the committees of the miners in the employ of the Tennessee Co. and the Sloss-Sheffield Co. during the past month did not show a high enough average to raise mining wages. The minimum wage, 47½c. per ton, is therefore paid Alabama miners for the month of April.

The Central Railroad of Georgia will shortly begin the work of developing coal lands purchased some months ago in the northeastern portion of Jefferson county.

The Semet-Solvey Co. at Ensley is finding a ready sale for the coal by-products. During the past week 300 tons of coal-tar pitch were shipped in one lot to the Barrett Manufacturing Co. in St. Louis, Mo., to be used in paper roofing for the St. Louis exposition. The Barrett Co. is building a paper-roofing factory at Ensley, near the Semet-Solvey plant. The Semet-Solvey is building another by-product plant at Holten, in Tuskaloosa county.

Chicago. April 11.

(From Our Special Correspondent.)

Anthracite continues active under the 50c. reduction that became effective April 1. Dock stocks are being diminished greatly, but probably will hold out until the opening of navigation, for which everybody is looking with interest now. Indications are that the Straits may be cleared of ice within a week or by April 25 at most. The all-rail business is comparatively heavy now, and coal is coming forward somewhat better than was reported a week ago. All sizes of anthracite are in demand, and no size is notably lacking. Present appearances indicate that the wholesale business of this month in anthracite will surpass that of any previous April.

The market is dull for bituminous, and spring prices promise to be 50c. to 75c. lower than those of last spring. Only in the Iowa market has there been in the last week any active demand, and that is mainly for the product of certain Illinois mines. Prices remain about the same as last week. the only differences being a little lower quotations on some kinds. Smokeless is in heavy supply, and brings $2.70@$3.25; Hocking also has too much on track for the present demand, and sells at $2.90@$3.15; Indiana and Illinois furnish the bulk of the trade, at $1.90@$2.50 for lump, $1.60@$1.85 for run-of-mine, and $1.40@$1.50 for screenings.

Cleveland. April 12.

(From Our Special Correspondent.)

The vessel-owners are now planning to trick lake shippers by sending a host of boats coal loaded to the head of the lakes and thus block the receiving ports. This may have the desired result, for the boatmen, but it will relieve much strained conditions in the Northwest. Coal is scarce there and has been for weeks. The long and severe winter has offset the heavy shipments of last summer. Unless the lake season opens in the meantime, May 15 will find Duluth and all the Northwest out of coal. This is helping the coal trade.

Trade conditions in this territory are easier. The improved railroad situation has not been offset by an increased consumption of coal, hence the market is easier. Steam coal is plentiful around $1.15 to $1.20 for Pittsburg at mine. Slack is selling between 90c. and $1.10 at mine. The demand for domestic is easing somewhat.

The coke trade is easier to the point of softening of prices. Good 72-hour coke ranges between $2.25 and $2.40 at the oven and good furnace coke sells at $1.60 to $1.75 at the oven.

Pittsburg. April 12.

(From Our Special Correspondent.)

Coal.—At a meeting of lake shippers of the Pittsburg district, Ohio and West Virginia, held during the week at Cleveland, prices were fixed for the season as follows: ¾-in. coal, $2.30 and 1¼-in. coal $2.40 a ton, f. o. b. vessel. These rates show a reduction of 15c. a ton compared with the prices last year. The freight rate from the Pittsburg district to lake ports is 83c. and the dockage is about 5c. which makes the rates agreed upon a trifle better than the quotations made here of $1.30 for ¾-in. and $1.40 for 1¼-in. at the mine. All the mines in the district are in satisfactory operation again and the outlook seems to be good. Another rise in the rivers enabled shippers to send out a large tonnage yesterday and to-day.

Connellsville Coke.—The coke trade continues to improve. Reports for March show the production in the region to have been 1,014,346 tons as compared with 84,471 tons for February. The quarter's production aggregated 2,546,837 tons as compared with 2,933,856 tons the first quarter of 1903. The production for the week was 225,153 tons. Shipments for the week amounted to 10,718 cars, a gain of 495 cars. Furnace coke is quoted at $1.75@$1.85 and foundry at $2.25@$2.40. The shipments for the week were distributed as follows: To Pittsburg and river points, 3,600 cars; to points west of Pittsburg, 5,604 cars; to points east of Everson, 1,515 cars.

San Francisco. April 7.

(From Our Special Correspondent.)

The market continues quiet, but generally steady. No changes in quotations are quoted.

Pacific coast coals in large lots to dealers are quoted as follows: Wellington and New Wellington, $8; Richmond, $7.50; Roslyn, $7; Seattle and Bryant, $6.50; Beaver Hill and Coos Bay, $5.50; white ash, $5.25. For Rocky mountain coals, ex-car, to dealers, prices are $14 for Colorado anthracite, $11.50 for Castle Gate, Clear Creek, Rocky Springs and Sunnyside. Eastern coal is still nominal at $14 for Pennsylvania anthracite, and $13 for Cumberland, with very high stocks. Foreign coal in cargo lots is quoted at $13 for Welsh anthracite, $8.50 for cannel, $7.50 for Wallsend and Brymbo.

Foreign Coal Trade. April 13.

Imports of coal into Germany for the two months ending February 29 are reported as follows, in metric tons:

	1903.	1904.	Changes.
Coal	792,512	738,473	D. 54,039
Brown coal	1,155,211	1,074,607	D. 80,604
Coke	68,648	85,206	I. 16,558
Totals	2,016,375	1,898,286	D. 118,085

The coal came chiefly from Great Britain; the lignite was all from Austria.

Exports of fuel from Germany for the two months were as follows, in metric tons:

	1903.	1904.	Changes.
Coal	3,022,066	2,936,825	D. 85,241
Brown coal	3,471	3,385	D. 86
Coke	387,160	417,286	I. 30,126
Totals	3,412,697	3,357,496	D. 55,201

The chief exports of coal were to Austria and Holland; of coke to Belgium. The exports to the United States this year were 2,665 tons of coke.

The coal production of Germany for the two months ending February 29 is reported as follows, in metric tons:

	1903.	1904.	Changes.
Coal	18,811,956	19,688,031	I. 876,075
Brown coal	7,558,730	8,084,706	I. 525,976
Total mixed	26,370,686	27,772,737	I. 1,402,051
Coke made	1,753,315	1,945,453	I. 192,138
Briquettes made	1,687,873	1,855,597	I. 167,724

Of the output this year, 18,329,978 tons of coal and 6,817,465 tons of lignite were from the mines of Prussia.

Messrs. Hull, Blyth & Co., of London and Cardiff, report, under date of March 31, that owing to the great and continued demand for best Cardiff for the Far East prices are exceedingly firm. Other descriptions and smalls show little or no movement. Quotations are: Best Welsh steam coal, $4.56; seconds, $4.20; thirds, $4.08; dry coals, $3.96; best Monmouthshire, $3.54; seconds, $3.42; best small steam coal, $2.04; seconds, $1.68; other sorts, $1.56.

The above prices for Cardiff coal are all f. o. b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f. o. b. Newport, both exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2½ per cent discount.

Freights remain unaltered except for South American ports, which are a shade easier. Some rates quoted from Cardiff are: Marseilles, $1.40; Genoa, $1.38; Naples, $1.32; Las Palmas, $1.44; St. Vincent, $1.56; Rio, $2.04; Santos, $2.46; Buenos Aires, $1.58.

IRON TRADE REVIEW.

New York, April 13.

The iron trade this week is somewhat quieter. In pig iron, buyers seem to be generally pretty well supplied over the first quarter, and there is still a good deal of hesitation about contracting for third-quarter deliveries. Furnacemen are not particularly pressing sales for anything later than June deliveries, until the ore question is settled. The Bessemer Ore Association, after postponing its meetings several times, has finally decided to meet on April 19, when it is hoped that the question for season prices will be finally settled. It is of somewhat less importance this year than usual, owing to the large stocks of ore on hand at lake docks and at furnaces. In steel billets there is less hesitation, and even some degree of pressure for early deliveries.

The different pools held meetings late last week, and reaffirmed current prices for billets, plates and structural material. This is important, as showing that the Steel Corporation has decided to try and maintain prices rather than to increase its sales by following the market down.

The tangle between the sheet and tin-plate manufacturers and the Amalgamated Association on the reduction of wages is not yet settled, but it is believed that some agreement will be reached this week.

Birmingham. April 11.

(From Our Special Correspondent.)

The demand for iron has been so steady and sales have aggregated so much since March 1 that some of the manufacturing companies see

fit to withdraw from the open market except to regular customers, whom they will make effort to supply at special prices. An advance of 25c. per ton was announced during the past week on all grades of iron, making No. 2 foundry $10.25. The Sloss-Sheffield Steel & Iron Co. on Thursday announced a sale of 300 tons of No. 2 foundry at the $10.25 rate, immediate delivery, and 300 tons No. 3 foundry on the same basis. All furnace companies in this district report having sold well ahead for the next three months, while some inquiry is already being made for iron during the third quarter of the year.

The following quotations are now mentioned: No. 1 foundry, $10.75; No. 2 foundry, $10.25; No. 3 foundry, $9.75; No. 4 foundry, $9.25; gray forge, $8.50@8.75; No. 1 soft, $10.75; No. 2 soft, $10.25.

The steel industry is picking up again. The blowing in of the steel rod, wire and nail mill this week at Ensley, plant of the Alabama Steel & Wire Co., means much for the industrial section. The plant has been out of operation since last June.

The steel plant of the Tennessee Coal, Iron & Railroad Co. is doing better now. Seven of the 10 open-hearth furnaces have been in operation and the production of steel rails is very favorable.

In finished iron and steel there is no change. All machine shops and foundries in the Birmingham district have work in hand or in sight. The cast-iron pipe factories are busy and shipments of pipe continue heavy.

The Birmingham Trust & Savings Co., as trustee, is receiving bids for the purchase of the plant of the Alabama Tube & Iron Co., situated at Helena, 16 miles south of Birmingham. The plant consists of a rolling mill, wrought-iron pipe plant, houses for operatives, office and lands. The bids will be opened April 30. The plant has not been in operation for more than a year. This is the only tube works in the South.

Chicago. April 11.

(From Our Special Correspondent.)

The pig iron market continues firm, though the tendency is not so bullish as a week ago. Prices are unchanged—$10 Birmingham or $13.85 Chicago for southern No. 2, and $14.50 for northern—on most sales. There is a disposition by buyers to hold off as long as possible, in the hope of a decline again, but to the sellers no decline seems in sight. Sales are large, as compared with the last six months, and everything points to a continuation of the present good condition of the market. With the reopening of furnaces in the Chicago district there is naturally some apprehension lest the market shall be overstocked again, but the fact seems plain that buyers are in need of iron, and must buy in larger quantities for the next six months than they bought in the previous six months. The prospects therefore are good for an indefinite future. No political changes seem imminent in market conditions, and local agents express the belief that the canvass preliminary to the election of a President will disturb business less than ever before. Sales are running into the third quarter of the year, and lengthening slowly the time between ordering and delivering, but both buyers and sellers are conservative on this point; it seems to be generally recognized that placing orders more than six months ahead of needs is not good policy.

Coke is somewhat too plentiful. The demand for spot coke, reported last week, has resulted in the usual heavy shipments and demurrage charges are likely to catch a large quantity of coke. Last week's minimum price, $4.90, is now the maximum, and may be shaded considerably if shipments are not curtailed.

Cleveland. April 12.

(From Our Special Correspondent.)

Iron Ore.—The Ore Association has not acted on prices and the market is awaiting that event. Meanwhile the channels between the upper and lower lakes are frozen and boats may not begin to run until the middle of May. The vessel owners are not much worried about the lateness of the season, preferring to hold the boats in port, if possible, until June 1. They are now busy devising means of creating an artificial shortage of boats. The dock managers and longshoremen have just come to an agreement, meaning a 10% cut in unloading charges for this season.

Pig Iron.—The demand for foundry pig iron is in 100 to 500-ton lots. A few contracts running larger. The sales now being made are therefore running smaller than they were a few weeks ago, but the aggregate tonnage is as large. The price is about $13.25@13.50 in the Valley for No. 2. No iron is offered at current prices for second half delivery, but a few claim to have made sales at $14.50 at furnace on contracts running through the third quarter. The supply of material for spot delivery is small. The call for basic is stronger, the supply being limited by the fact that some basic stocks are running on bessemer. The market is fairly strong at about $13.50 in the Valley.

Finished Material.—A week ago it seemed as if rail buying might become a feature of the market. The demand came from traction companies, and more orders were in evidence. The projects are not yet financed and the rail orders must wait. Bars continue the strength of the trade. The prices are 1.35c. Pittsburg for bessemer steel and iron bars and 1.40c. for open-hearth steel bars. The demand for sheets has improved somewhat.

Old Material.—Scrap is in fair demand, but nothing out of the ordinary. Prices hold their own, but steel inclines to be weak.

New York. April 13.

Pig Iron.—The local market is quiet but fairly strong. We quote at tidewater as follows: No. 1 X foundry, $15.70; No. 2 X foundry, $15.20; No. 2 plain can be had for 50c. less; while gray forge is selling around $14.20. For Southern irons on dock quotations are: No. 1 foundry, $14.25; No. 2 foundry, $13.75; with lower grades in proportion. No. 1 soft can be had at about $14.25, and No. 2 soft at $13.50.

Plates.—Demand is quiet but improvement is expected. Sheared plates are quoted as follows: Tank, 1¼-in. and heavier, 1.75@1.80c.; flange, 1.85@2.05c.; marine, 2.05@2.15c.

Bar Iron and Steel.—There is no special change in market conditions. Refined bars are quoted at 1.45@1.50c., in large lots, with steel at 1.50c. Common iron bars can be had for 1.35c.

Steel Rails.—The quotations remain $28 for standard sections, f. o. b. mills. Light rails are quoted f. o. b. eastern Pennsylvania mills as follows: 12-lb., $27; 20-lb., 25-lb., 30-lb., and 35-lb., $25; 40-lb. and 45-lb., $24.

Structural Material.—Some improvement is noted in the local market. Large lots at tidewater are still quoted at 1.75@2c. for beams, angles and channels.

Philadelphia. April 13.

(From Our Special Correspondent.)

Pig Iron.—The factor of Southern pig iron competition is being gradually eliminated, and with this is coming a demand from quite a number of large consumers of iron for deliveries during the third quarter of the year. Quite a number of our consumers are now receiving Southern iron ordered some time ago, and it is these people who are at present most active in negotiating for Northern iron for late delivery. The market is gradually hardening, but no pronounced advance has been made during the week past. For the first time in several months we are meeting a good demand in forge iron, and all the mill people are either looking after supplies or are making purchases. Our big pipe works are also once more in the market and quite a business has been done in both Northern and Southern pipe iron. The entire situation is more gratifying and consumers feel they must act promptly. Quotations may be given at $16 for No. 1 X; $15.25 for No. 2 X; No. 2 plain sold at $14.75; Southern No. 2 by rail is offered to-day at $14.50; best forge iron is held at $14, though some brands have been taken at $13.50. The bottom price for basic to-day is $14 and furnace representatives are threatening to quote $14.50.

Billets.—A general stir up has taken place in the billet market and orders have been taken at $24.50. Billet people are not seeking buyers as they did a month ago, and consumers are disposed to close orders at once. Quite a number of small lots were bought yesterday and to-day.

Merchant Bar.—A good business has been done this week in common, refined and steel bars. The bulk of it is in small lots. Car builders are still awaiting developments. Quotations are given at 1.50@1.55 with common bars about 0.2c. less.

Sheets.—Two or three large consumers of sheet iron who are about closing for large lots say there is no upward tendency and that they have secured supplies for the early summer at the favorable quotations of a month ago. This does not apply to the smaller ones, who are chasing their orders to the mills almost daily at the outside quotations given.

Pipes.—All kinds of pipes are very strong and buyers are placing orders based on quotations of two weeks ago.

Boiler Tubes.—A sharp improvement in demand has set in.

Merchant Steel.—The merchant steel people are unable to give an encouraging report this week as to new business, but their April business up to this date shows that merchant steel consumption is up to the maximum point for this season. An upward tendency is keeping consumers on the watch.

Plates.—Manufacturers are satisfied with the trend of demand, but admit there is a little hesitancy upon the part of some of the larger consumers. Tank steel, ¼-in., in small lots ranges from 1.78½@2.03½, according to gauge.

Structural Material.—Several very large orders have been placed since last report covering heavy local requirements. Quotations range from 1.73½@1.85c.

Scrap.—All kinds of scrap are very firm. Prices for No. 2 light scrap range from $12.50 @13; wrought turnings, $10; cast borings, $8. Choice railroad scrap, $18.50; none in the market. No. 1 steel scrap nominally $16; all cleaned up.

Pittsburg. April 12.

(From Our Special Correspondent.)

Some surprise was caused yesterday when the United States Steel Corporation asked for an extension of its options on bessemer pig iron. The options which expired technically on Sunday were for 30,000 tons from the Bessemer Pig Iron Association and 15,000 tons from W. P. Snyder & Co. An extension was asked until to-morrow and it was granted. It is now learned positively that the options will not be exercised. The corporation last week added to its purchase of outside bessemer iron by buying from the Cleveland Furnace Co. 10,000 tons at $13.85 delivered either at Lorain or Cleveland. As the freight rate from the Valley furnaces to these points is 5c., the rate is the same as for the iron recently purchased and under option. The Cleveland furnace, however, receives from 60 to 70c. more, as the freight from the furnace to Cleveland is 25c. and to Lorain 15c. The iron is for April and May delivery. The furnaces have been doing much better during the past two weeks in shipments and there will be no cancellation of contracts. J. G. Butler, Jr., chairman of the Bessemer Pig Iron Association, reports that on April 1, of 159 furnaces tributary to the Lake Superior ore region, with a daily capacity of 46,816 tons, there were 125 in blast and 34 out of blast, the percentage capacity being 85.5 and the idle capacity 14.5. The pig iron market this week is quiet and consumers seem to be covered for two or three months and there is no disposition to contract for iron for third-quarter delivery. Some fair-sized orders have been received within the past week in bessemer and forge iron, but no foundry of any consequence has been sold. There is considerable speculation, but no one seems to be able to give a good reason for the numerous postponements of the meeting of ore producers. It was originally fixed for April 1

when the date was changed to the 7th, afterwards to the 12th and then to Tuesday the 19th. Up to noon to-day no further postponement had been announced. One of the rumors as to the cause of the delay is that some merchant or producers want time to make long time or other contracts, after which they will be prepared to enter into an agreement covering shipments for the rest of the season. There is but little change in the steel market. The demand continues good and prices are firm. At the meetings held last week prices were reaffirmed in billets, plates and structural material. The billet association's prices which were continued are: Bessemer and open-hearth billets, 4 x 4 and larger, 0.25%, and less carbon, f. o. b. Pittsburg, Wheeling or valleys, $23; small billets and sheet bars, long lengths, $24; extra for shearing to specifications, 50c. Wire rods are $31 to $32 for either bessemer or open-hearth. Plates and beams will continue at 1.60c. for the second quarter and the demand is unusually good. The demand for sheets and tin-plate is excellent and it is reported that a stiff advance in sheets is to be ordered this week by the American Sheet & Tin Plate Co. The situation in these lines is very peculiar. The expanded conference of the Amalgamated Association of Iron, Steel & Tin Workers has been in session since last Wednesday considering the proposition for a reduction in the sheet and tin-plate scales of 20% from the agreement of 1903-04. The cut was ordered by the general executive board and submitted to a vote of the membership for approval, but was rejected. It was believed the conference would reverse the vote of the membership after hearing the arguments of the manufacturers as to conditions existing in those branches. The conference, however, decided on Saturday afternoon to accept a cut of 10% in tin-plate, a similar reduction in sheets having gone into effect on January 1. The manufacturers wanted a straight cut of 20% for tin plate and an additional reduction of 10% in sheets. When the conference presented the decision to the manufacturers it was rejected. To-day the delegates decided to make an addition cut of 2.5% on sheets, but the manufacturers again refused to settle on those terms. The conference is considering the matter and may present another proposition to the manufacturers this evening.

Pig Iron.—A number of small sales of bessemer pig iron are reported at $13.50, Valley furnaces, and higher. One lot of 1,000 tons was sold at the minimum rate. A fair tonnage of gray forge was sold during the past few days, prices ranging from $13.25 to $13.50, Pittsburg, including 1,000 tons at the lower price for early delivery and a like tonnage for late shipment at a trifle less than $13.50. A typographical error in last week's report put gray forge at $13.85 instead of $13.25. Foundry No. 2 is extremely quiet, but a few insignificant sales were made at $14.25, Pittsburg.

Steel.—Bessemer billets continue scarce for early shipment, and premiums above the association price of $23 are paid. There is but little inquiry for late shipment. Steel bars are in demand and the price is firm at 1.35c. The plate market is very active and 1.60c. is still quoted.

Sheets.—The sheet market appears to be improving and it is rumored that the leading producer contemplates advancing the price for all grades as soon as the controversy over the wage question is arranged with the Amalgamated Association. No. 28 gauge black sheets are still quoted at 2.30c. and galvanized at 3.30c.

Ferro-manganese.—There is no change in the market and 80% domestic is still quoted at $42.50@$43 per ton.

Cartagena, Spain. Mar. 26.

(*Special Report of Barrington & Holt.*)

Iron and Manganiferous Ores.—Shipments reported are two cargoes, 5,050 tons manganiferous ore, and one cargo, 2,600 tons, dry ore, all to Great Britain. A few contracts for future delivery have been made, but prices remain unchanged.

Current quotations for iron ore are: Ordinary 50% ore, 6s. 6d.@6s. 9d.; special low phosphorus, 7s.@7s. 6d.; specular ore, 58% iron, 9s.; magnetic ore, 60%, 11s. 3d. for lumps and 9s. 3d. for smalls. Manganiferous ores range from 14s. 3d. for 20% iron and 20% manganese down to 9s. 3d. for 35% iron and 12% manganese.

Pyrites.—Iron pyrites, 40% iron and 43% sulphur, are quoted at 10s. 3d. per ton.

CHEMICALS AND MINERALS.

(See also Prices-Current on page 630.)

NEW YORK, Apr. 13.

Hope for a better financial position this year is strengthening in the trade. Certainly heavy chemicals will show a marked improvement, and in most lines of raw materials the tendency is upward.

While the German Potash Syndicate is contemplating the readjustment of quotas of production, the Aschersleben Potash Works Co., capitalized at $3,000,000, and with a loan charge of $782,500, has declared its sixth consecutive annual dividend of 10%; net profits in 1903 were about $375,515. The Friedrichshall Co., in order to acquire and underwrite the Glückauf Works, at Saarstedt for $312,500, has recently increased its share-capital from $1,000,000 to $1,562,500. With the balance of $250,000 from the additional capital the Friedrichshall Co. will sink a new shaft adjoining the Saarstedt property, and incidentally lay aside an amount sufficient to 'protect' itself in the advent of a dissolution of the potash syndicate. Similarly the Mecklenburg Co., of Jessenitz, has postponed payment of the 4% dividend on one class of its shares, believing it expedient to await the result of the negotiations of the syndicate.

In view of the large export trade between Germany and the United States in the fiscal year ended June 30, 1903, it is interesting to give some figures that have recently been compiled, showing the exports to this country:

Arsenic	$71,509	Potash, prussiate	$5,688
Barytes	53,447	Pumice stone	13,615
Cadmium	4,536	Selenium	2,153
Cerium nitrate	3,099	Soda, chlorate	16,165
Chrome alum	19,922	Soda, prussiate	1,435
Cobalt oxide	27,471	Soda, sulphate	29,068
Emery powder	3,438	Soda, sulphite	1,069
Ferro-molybdenum	4,594	Strontium, nitrate	7,315
Fluorspar	2,295	Thorium nitrate	8,761
Iridium	10,301	Tungsten metal	6,546
Lead, hyposulphite	1,541	Wolfram ore	11,578
Potash, carbonate	151,456	Zinc dust	32,286
Potash, caustic	110,482	Zinc pigment	94,906
Potash, cyanide	531,867		
Potash, permanganate	9,729	Total	$1,236,272

During the same fiscal year Great Britain declared exports to this country as follows: Alum, $3,244; bauxite, $14,794; Fuller's earth, $115,149; iron oxide, $5,249; phosphorus, $9,201; sodium chlorate, $21,903; sodium silicate, $7,030; sulphur, refined at Liverpool, $193,224; zinc chloride, $2,708. Heavy chemicals and other specially enumerated substances have already been mentioned in this column.

An interim dividend at the rate of 6% per annum has been declared on the preferred stock of the Anglo-Sicilian Sulphur Co. for the half-year ending January 31. During this period sulphur exports from Sicily amounted to 211,536 tons, and prices advanced in the primary market from 30 to 42c. per ton for crude brimstone, from 24 to 30c. for refined block, and from 30 to 84c. for sublimed flowers. On the other hand, it is noteworthy that stocks in Sicily have grown 19%, from 304,255 tons on August 1, 1903, to 362,265 tons on January 31, 1904.

Cyanide.—Seasonably quiet at 19@20c. per lb. at New York.

Zinc Dust.—Apparently sellers are determined to bring prices to a remunerative basis by quoting 5@5.25c. per lb. Two factors are responsible for the higher market to-day, the increased consumption of zinc dust in the recovery of gold treated by the cyanide process, and the import duty of 1.5c. per pound.

Bleaching Powder.—New orders are of small volume, and are filled by second-hands. Importers quote prime brands at $1.25 per 100 lb. for British, and $1.20 for Continental, while domestic is worth $1.25. Of course off-test goods can be had at a discount.

Copper Sulphate.—There is a slight relaxation in the export trade as the season for European buying is nearing the end. Domestic sales are reported at $5.20@$5.25 per 100 pounds.

We quote as below per 100 lb., unless otherwise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity:

Muriatic, 18°	$1.50	Oxalic, com'l.	$5.10@$5.50
Muriatic, 20°	1.60	Sulphuric, 50°, bulk, ton	13.50@14.50
Muriatic, 22°	1.75	Sulphuric, 60°	1.05
Nitric, 36°	4.50	bulk, ton	18.00@20.00
Nitric, 38°	4.75	Sulphuric, 66°	1.20
Nitric, 40°	5.00	bulk, ton	21.00@23.00
Nitric, 42°	5.50		

Brimstone.—Dock sales are noted at $22.25@$22.50 per ton, while shipments of best unmixed seconds are worth $21.75@$22. Best thirds are about 75c. less than seconds.

Exports from Sicily in the two months ending February 29 were as below, in long tons:

	1903.	1904.	Changes.
United States—Seconds	24,945	17,188	D. 7,757
United States—Thirds	7,071	3,150	D. 3,921
	32,016	20,338	D.11,678
France	19,231	21,529	I. 2,298
Italy	7,600	7,870	I. 221
Other countries	27,543	24,881	D. 2,662
Total exports	86,399	74,618	D.11,781
Stocks in Sicily, Feb. 29	307,020	370,589	I. 63,569

Exports show a decrease of 13.6%, principally to the United States, while stocks abroad have grown 20.7%, and are sufficient to supply a normal demand for 10 months.

Commenting on the situation in Sicily, Messrs. Emil Fog & Sons write under date of March 31 that the impending strikes in the mining districts were fortunate, the Anglo-Sicilian Sulphur Co. paying a 6d. a ton higher price to the proprietors, who assume to their charge the miners' insurance premium. Leblanc's method of manufacturing soda, it appears, is gradually being abandoned. This means a diminution in the production of recovered sulphur, and from 20,000 to 30,000 tons in demand which will revert to Sicilian brimstone. Foreign exchange having again declined, sterling quotations are raised 6d. to 1s. a ton. Freights continue firm. We quote sulphur as follows, per ton: Best unmixed seconds, in bulk, 81s. 9d.; ground seconds in bags, 90s. 6d.; best thirds, in bulk, 79s.; current thirds, 77s. 6d.; refined block, 89s. 9d.@92s. 6d.; refined roll, 95s. 9d.@101s. 3d., and sticks, 105s.@107s. 6d.; sublimed flowers, pure, 108s. 6d.; current, 100s. 9d., and commercial, 95s.

Pyrites.—There is no excitement to warrant comment. Deliveries are on contract, and prices are unchanged. It is interesting to note, however, that the Rio Tinto Co., of Spain, shipped to America in 1903 a total of 163,245 tons pyrites; Germany received 264,235 tons, and Great Britain, 240,268 tons, making in all 667,748 tons, as against 595,092 tons in the previous year. The pyrites mined by the Rio Tinto Co. in 1903 averaged 2.39% copper.

We quote domestic pyrites $5 per ton for lump ore, f. o. b. Atlantic coast mines, and 9c. per unit for fines; sulphur content varies from 42@44%. Spanish pyrites, carrying from 46@52% sulphur, are quoted at 11@11.5c. per unit for lump, and 9.5@10c. for fines, delivered at Atlantic ports.

Nitrate of Soda.—Prices are firmer, the increased consumption quickly taking up arrivals. Spot is worth $2.25 per 100 lb., and shipments $2.125@$2.15, according to position.

The purchase of virgin mineral land by the Compañia Salitrera Alemana, in the vicinity of Gallinazos, in Tarapaca, Chile, last November at a cost of $8,400 Chilean ($3,066 gold), recalls the acquisition of the extensive property and plant of Fölsch & Martin, of Iquiqui, by the same company a little over a year ago, for 12,000,000 marks ($2,856,000). This company is capitalized at 15,000,000 marks ($3,570,000), and represents various agricultural associations in Prussia, to produce their own nitrate of soda in Chile, and sell the surplus. At the annual meeting of the Deutsche Saltpeterwerke at Hamburg, Germany, on September 12 last it was shown that the outstanding capital amounted to 11,634,000 marks ($2,768,892); that the mines acquired held in reserve between 67,000,000 and 83,000,000 Spanish quintals (3,032,946 to 3,757,232 long tons); that the sales from the Atacama mines in the first year, 1902, showed a net profit of 122,190 marks ($29,081), permitting the payment of a regular dividend of 8%, and an extra of 8.85 per cent.

Mexico is to develop a nitrate of soda industry, it is reported, as C. R. Trox, of Chihuahua,

has taken an option on his discovery. Of course the expansion in mining will depend on the grade of mineral and its economical transportation.

Chilean Nitrate of Soda Market.—Messrs. Jackson Bros., of Valparaiso, write under date of March 5 that there has been no interest shown by exporters to operate in the 95% quality, and only a few small parcels have changed hands for prompt delivery at 6s. 11d.@ 7s. ½d. alongside. On the other hand, producers are not free sellers, and the majority ask 6s. 11d.@7s., alongside, for any delivery this year. In the refined quality, transactions have taken place for August-February delivery at 7s. 1d. alongside, while for April-May sellers are asking 7s. 6d.; July-October, 7s. 4d. Exports for January-February amount to 5,423,800 qtls., against 5,143,660 qtls. during the corresponding period of last year; and the consumption, 7,537,400 qtls., against 7,168,503 qtls. We quote 95%, March, 6s. 11½d.; April-May, 7s.; June-December, 6s. 11d., all alongside terms. The price of 6s. 11d., with an all-round freight of 17s. 6d., stands in 8s. 7d. per cwt. net cost and freight, without purchasing commission. Sales reported for the fortnight are 270,000 qtls. and resales, 121,000 qtls.

Sulphate of Ammonia.—There is a quiet demand at $3.15@$3.175 per 100 lb. for gas liquor.

Saltpeter.—Consumption in America in the three months ending March 31 is reported at 15,718 bags; stocks on hand April 1 were 1,303 bags; on way, 16,351 bags; apparent supply, 17,654 bags. Crude is worth $3.45@$3.50 per 100 lb., and refined, $4@$4.50.

Phosphates.—The foreign market has hardened as regards prices, and recent orders have been at an advance. It appears that exporters act in unison when quoting on future deliveries, because stocks at mines are not large and the quantity unsold is so small as to encourage a higher market. Unlike previous years, hard-rock miners are not seeking orders energetically, realizing, perhaps, that consumers are well enough posted to know that production will hereafter be regulated so as to bring better prices. On the other hand, European superphosphate manufacturers "have their ear to the key-hole," hoping that dearer raw material will influence the value of their goods, which, by the way, has been rather low of late.

Foreign phosphates hold firm, and the exports now made command better prices than a year ago. In the two months ending February 29 the shipments from Boné, Algeria, amounted to 40,848 metric tons, of which Great Britain received 17,662 tons, Germany and Holland together, 5,730 tons; France, 5,268 tons, and Austria, 4,800 tons, the balance going to five other countries. Compared to last year, these shipments show a decrease, owing principally to the smaller trade with France and Roumania. Of the total of 40,848 tons shipped this year, the Constantine Phosphate Co. reported 20,950 tons, or 51.3%; the Compagnie des Phosphates du Dyr, 11,500 tons, and the Societé Francaise des Phosphates de Tebessa, 8,398 tons.

Ocean freights are slightly firmer, though charters have been comparatively few.

	Shipping ports— Florida.	So. Carolina.	Africa.
Baltic	$3.46@$3.74	$2.26	2.18
Continental	2.76@ 3.00	.... 1.80@	2.22
Mediterranean	3.36@ 3.60	....	1.80
United Kingdom	2.64@ 3.12	2.56@ 2.64 1.86@	2.04

Prices for phosphates are as follows per ton:

Phosphates.	F. o. b.	C. i. f. Gt. Britain or Europe.
*Fla. hard rock, 77@80%	$6.50@ 7.00	$9.84@$10.83
land pebble, 68@73%	3.75@ 4.00	7.35@ 8.05
†Tenn. 78@80%	4.00@ 4.25	9.54@ 10.56
78%	3.75@ 4.00	.....
75%	3.25@ 3.50	.....
73@74%	2.95@ 3.20	.....
‡So. Car. land rock	3.25@ 3.50	.....
river rock, 55@60%	3.00@ 3.25	5.61@ 6.04
Algerian 63@70%	.....	6.82@ 7.32
58@63%	.....	6.05@ 6.50
53@58%	.....	4.95@ 5.09
Tunis (Gafsa)	.....	5.75@ 6.50
Christmas Isle, 80@85%	.....	11.75@ 12.54
Ocean Isle, 82@88%	.....	12.54@ 12.98
Somme, Fr., 70@75%	.....	10.63@ 11.02
Bordeaux, Fr., 60@65%	.....	7.60@ 7.72
55@60%	.....	6.44@ 6.55
Liege, Bel., 60@65%	.....	7.00@ 7.10

* F. o. b. Florida or Georgia ports. † F. o. b. Mt. Pleasant. ‡On vessel, Ashley River, S. C.

Liverpool. Mar. 30.

(Special Report of Joseph P. Brunner & Co.)

Manufacturers report a better inquiry for most heavy chemicals, but the actual business passing is only moderate.

Soda ash is firm. For tierces, nearest range is about as follows: Leblanc ash, 48%, £5@ £5 10s.; 58%, £5 10s.@£6 per ton, net cash. Ammonia ash, 48%, £4 5s.@£4 10s.; 58%, £4 10s.@£4 15s. net cash. Bags, 5s. per ton under price for tierces. Soda crystals are in fairly good demand at generally £3 7s. 6d. per ton, less 5% for barrels, or 7s. less for bags, with special terms for a few favored markets. Caustic soda is selling to a moderate extent at late rates: 60%, £8 15s.; 70%, £9 15s.; 74%, £10 5s.; 76%, £10 10s. per ton, net cash. Special quotations for export to the Continent and a few other export quarters. Bleaching powder is still slow of sale at £4 5s.@£4 10s. per ton, net cash, for hardwood casks, as to market.

Bicarbonate of soda is selling at £6 15s. per ton, less 2½% for the finest quality in 1 cwt. kegs, with usual allowances for larger packages, also special terms for a few favored markets.

Sulphate of ammonia is quiet but steady, at about £12 15s.@£12 16s. 3d. per ton, less 2½% for good gray 24@25% in double bags f. o. b. here.

Nitrate of soda is in better supply on spot, but holders still quote from £10 7s. 6d.@£10 12s. 6d. per ton, less 2½% for double bags f. o. b. here, as to quantity and quality.

METAL MARKET.

New York, April 13.

Gold and Silver Exports and Imports,

At all United States Ports in February and Year.

Metal	February. 1903.	1904.	Year. 1903.	1904.
Gold:				
Exports.	$1,506,370	$732,614	$1,592,321	$1,324,181
Imports.	1,817,456	5,030,372	3,828,307	13,255,880
Excess	I. $311,086	I. $4,297,758	I. $2,235,988	I. $11,931,699
Silver:				
Exports.	3,866,514	3,801,869	7,444,395	8,419,996
Imports.	1,687,007	2,110,675	3,181,563	4,720,047
Excess	E. $2,179,507	E. $1,691,194	E. $4,262,832	E. $3,699,949

These exports and imports cover the totals at all United States ports. The figures are furnished by the Bureau of Statistics of the Department of Commerce and Labor.

Gold and Silver Exports and Imports, New York.

For the week ending April 9 and for years from January 1.

Period.	Gold. Exports.	Gold. Imports.	Silver. Exports.	Silver. Imports.
Week	$2,696,107	$23,219	$746,905	$30,131
1904	5,173,267	1,556,923	12,949,545	207,661
1903	1,315,951	2,505,897	5,347,870	336,197
1902	16,419,384	963,061	9,976,324	375,296

Exports of gold were to France and the Argentine Republic. Exports of silver were chiefly to London.

General business continues quiet, and there is no special change to report. Gold continues to go out slowly, about $3,500,000 having been exported since the movement began.

The statement of the New York banks—including the 56 banks represented in the Clearing House—for the week ending April 9, gives the following totals, comparisons being made with the corresponding week of 1903:

	1903.	1904.
Loans and discounts	$902,779,500	$1,038,533,000
Deposits	884,830,000	1,085,512,800
Circulation	43,126,400	35,622,800
Specie	158,954,700	223,101,400
Legal tenders	65,994,300	71,193,200
Total reserve	$224,949,000	$294,294,600
Legal requirements	221,207,700	271,378,200
Balance surplus	$3,741,300	$22,916,400

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparison is made with the holdings at the corresponding date last year:

	1903. Gold.	1903. Silver.	1904. Gold.	1904. Silver.
N. Y. Ass'd	$158,954,700	.....	$223,101,400	.....
England	171,751,610	.....	167,296,875	.....
France	501,166,805	$219,693,735	474,291,300	$222,872,595
Germany	152,215,000	53,130,000	153,200,000	53,825,000
Spain	72,330,000	101,415,000	73,225,000	98,850,000
Netherlands	19,678,000	32,930,500	27,212,500	32,892,500
Belgium	16,060,000	8,030,000	15,416,665	7,707,335
Italy	88,575,000	11,369,500	110,300,000	19,016,000
Russia	386,615,000	42,175,000	434,190,000	41,825,000
Austria	229,210,000	66,955,000	235,725,000	64,430,000

The returns of the Associated Banks of New York are of date of April 9, and the others April 7, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

Silver has declined under condition of dullness and weakness in Eastern exchanges. The market to-day, however, has received some support from speculative sources and this may stiffen the exchanges in the near future.

The United States Assay Office in New York reports receipts of 16,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to March 31 are reported by Messrs. Pixley & Abell's circular as follows:

	1903.	1904.	Changes.
India	£2,067,500	£3,318,839	I. £1,251,339
China	106,500	71,000	D. 35,500
Straits	128,491	58,103	D. 70,388
Total	£2,302,491	£3,447,942	I. £1,145,451

Receipts for the week were £168,000 in bar silver from New York, and £8,000 from Australia; total, £176,000. Shipments were £75,000 in bar silver to Bombay, and £5,000 to Calcutta; total, £80,000.

Indian exchange is firmer, and the Council bills offered in London were taken at an average of 16.06d. per rupee, the full amount offered being sold. For the present the demand for silver for Indian account has almost ceased, while there is very little call for the metal from China

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars	$0.44	$0.47½
Peruvian soles and Chinese pesos	.40	.45
Victoria sovereigns	4.85½	4.87
Twenty francs	3.85	3.87
Spanish 25 pesetas	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

April	Silver— New York, Cts.	Silver— London, Pence.	Copper— Lake, Cts. per lb.	Copper— Electrolytic, Cts. per lb.	Copper— London, £ per ton.	Tin, Cts. per lb.	Lead, Cts. per lb.	Spelter— N. Y., Cts. per lb.	Spelter— St. Louis, Cts. per lb.
7	54¼	25 1/16	13 @13¼	12⅞ @13	58½	28¼	4.45 @4.50	5.20	5.00
8	54¼	25 1/16	13 @13¼	12⅞ @13	58½	28¼	4.45 @4.50	5.20 @5.22½	5.00 @5.05
9	53¾	24 13/16	13 @13¼	12⅞ @13	....	28¼	4.45 @4.50	5.20 @5.22½	5.00 @5.05
11	53⅝	24⅝	13 @13¼	12⅞ @13	58½	28	4.45 @4.50	5.22½	5.05
12	53⅝	24⅝	13 @13⅛	12⅞ @13	58½	28⅛	4.45 @4.50	5.22½	5.05
13	53¾	24 13/16	13 @13¼	12⅞ @13	58	28⅛	4.45 @4.50	5.22½ @5.27½	5.05 @5.10

London quotations are per long ton (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wire-bars: the price of electrolytic cathodes is usually 0.25c. lower than these figures

QUOTATIONS ON STERLING EXCHANGE.

April	7	4.87¼	April	11	4.87¼
"	8	4.87¼	"	12	4.87¼
"	9	4.87¼	"	13	4.87¼

Copper has ruled quiet but firm throughout the week, and nothing of special interest has transpired. Consumption remains quite satisfactory both here and abroad. The closing quotations are unchanged at 13@13¼ for Lake; 12⅞@13c. for electrolytic in ingots, cakes and wirebars, 12⅝@12¾ in cathodes; 12½@12⅝ for casting copper.

The market for standard copper in London, which closed last week at £58 10s., opened on Monday at £58 7s. 6d., and the closing quotations on Wednesday are cabled as £57 17s. 6d. @£58 for spot, £57 12s. 6d.@£57 15s. for three months.

Refined and manufactured sorts we quote: English tough, £61 15s.@£62; best selected, £62 5s.@£62 10s.; strong sheets, £72 10s.@£72 15s.; India sheets, £70 10s.@£70 15s.; yellow metal, 6⅜@6½d.

Exports of copper from Baltimore in the week ending April 12 were 1,058 tons, principally to Germany. Imports were 447 tons from Great Britain.

Tin.—There has been a very good demand on the part of consumers and, in spite of the heavy arrivals, values have been well maintained. The closing quotations are 28⅛ for spot and futures.

The foreign market, which closed last week at £127 7s. 6d., opened on Monday at £127, declined on Tuesday to £126 10s., and the closing quotations on Wednesday are cabled as £127@£127 2s. 6d. for spot, £126 15s.@£126 17s. 6d. for three months.

Lead has ruled very quiet indeed throughout the week, with the demand nothing out of the ordinary. The closing quotations are given as 4.45@4.50 New York, 4.37½@4.42½ St. Louis.

The foreign market is steady, Spanish lead being quoted at £12 6s. 3d., English lead at £12 8s. 9d.

St. Louis Lead Market.—The John Wahl Commission Co. telegraphs us as follows: Lead is dull but steady. Missouri brands are selling at 4.40c., while 4.42½c. is asked for argentiferous.

Spanish Lead Market.—Messrs Barrington & Holt report from Cartagena, Spain, under date of March 26, that the price of silver during the week has been 14.50 reales per oz. Exchange is 34.85 pesetas to £1. Local quotation for pig lead on wharf has been 68 reales per quintal, which, on current exchange, is equal to £10 18s. 5d. per long ton, f. o. b. Cartagena. Exports were 50,000 kg. pig lead to Hamburg, 1,523,389 kg. to London and 210,280 kg. desilverized lead to Marseilles.

Spelter.—The market has again developed considerable strength and we have to report another advance. The closing quotations are given as 5.05@5.10 St. Louis, 5.22½@5.27½ New York.

The foreign market remains firm, good ordinaries being quoted at £22 5s., special at £22 10s.

St. Louis Spelter Market.—The John Wahl Commission Co. telegraphs us as follows: Spelter is very firm, selling at 5.05c. for both prompt and future delivery; at this price orders can be placed in moderate quantities.

Silesian Spelter Market.—Herr Paul Speier writes from Breslau, under date of March 29, that the market remains firm, and there is rather a tendency towards an advance in prices. Quotations are 21.40@21.80 marks per 50 kg., f. o. b. cars, Breslau; this is equivalent to 4.63@4.71c. per lb. For zinc dust there has been a better inquiry, and several sales have been made around 41 marks per 100 kg., f. o. b. Stettin. Exports of spelter from Germany for the three months ending with March were 9,950 tons; zinc sheets, 2,195 tons. Imports of zinc ore were 11,004 tons. Exports of zinc white were 2,409 tons and of lithophone, 1,202 tons.

Spanish Zinc Ore Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of March 26, that prices are still firm, and there is some competition for ores. The output of some of the larger mines has been taken up for several months ahead. Quotations continue 65 fr. per ton for blende, 35%, and 45 fr. for calamine, 30% zinc. The shipments for the week were 450 tons blende to Antwerp and 833 tons to Swansea.

Antimony is dull. The ruling quotations are: Cookson's, 7¾@8c.; Hallett's, 6⅝@6⅞; U. S., Italian, French, Hungarian, Japanese and Chinese, 6⅜@6½c.

Nickel.—The price is quoted by leading producers at 40@47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quantity, runs as high as 60c. per lb.

Platinum.—Platinum and its allied metals, which depend almost entirely upon the Ural Mountains for their crude supply, have already felt very decided results of the Russian-Japanese war, owing to heavy withdrawals of forces from this mountain district by the Russian government, the effect of which has naturally caused an advance in current rates.

For some time there has been an increasing demand for platinum and its alloys in the electrical and chemical fields, which is constantly being supplemented by the increasing use of gas engines, automobiles, and various new electrical appliances having platinum contacts and attachments. This growing demand, with doubtless a long continuance of the present situation in Russia, would strongly point to a further advance in a very short time.

Quicksilver.—The New York price is $45 per flask for large lots, while a slightly higher figure is quoted for smaller orders. The San Francisco quotations continue at $44@$45 per flask for domestic orders, and about $41.50 for export. The London price is £8 5s. per flask, with the same quotation asked by second hands.

Cadmium.—According to Herr Paul Speier, metallic cadmium is in good demand. Metal containing 95.5% cadmium sells at 700 marks per 100 kg., delivered in Berlin or Hamburg.

Minor Metals and Alloys.—Wholesale prices, f. o. b. works, are as follows:

	Per lb		Per lb
Aluminum		Ferro-Tungsten (37%)	.38c.
No. 1, 99% ingots	.33@37c.	Magnesium, pure (N. Y.)	.60c.
No. 2, 90% ingots	.31@34c.	Manganese	$2.75
Rolled Sheets	4c. up	Mangan'e Cop. (20% Mn)	.32c.
Alum-bronze	.20@23c.	Mangan'e Cop. (30% Mn)	.38c.
Nickel-alum	.31@39c.	Molybdenum (Best)	$2.00
Bismuth	$2.10	Phosphorus, foreign	.45c.
Chromium, pure (N. Y.)	.80c.	Phosphorus, American	.70c.
Copper, red oxide	.50c.	Sodium metal	.50c
Ferro-Molybde'm (50%)	$1.25	Tungsten (Best)	.88c.
Ferro-Titanium (10%)	.90c.		
Ferro-Titanium (20@25% N. Y.	.55c.		

Variations in price depend chiefly on size of order.

Missouri Ore Market. April 9.

(From Our Special Correspondent.)

The highest price reported paid for zinc ore was $40 per ton for one bin of particularly high-grade and well concentrated zinc ore. The assay basis remains practically unchanged at $34@$37 per ton of 60% zinc, and prices generally are unchanged from the previous week.

The lead market continued strong throughout the week, by the competition of local smelters, one of which, the Serage smelter at Carterville, was burned on Friday night. Lead producers are hoping that this will not have the effect of lowering the market next week.

Following are the shipments of zinc and lead from the various camps of the Joplin district for the week:

	Zinc, lb.	Lead, lb.	Values.
Joplin	2,797,210	268,830	$58,150
Webb City-Carterville	1,822,260	503,250	43,750
Alba-Neck	1,380,530	.....	27,850
Duenweg	928,920	160,070	21,520
Galena-Empire	720,450	124,170	15,125
Aurora	681,310	3,340	11,185
Carthage	341,470	.....	6,145
Oronogo	314,520	9,170	6,110
Prosperity	263,530	8,410	4,850
Badger	226,490	.....	4,190
Granby	275,000	37,000	4,020
Zincite	217,940	.....	3,925
Carl Junction	123,370	13,340	2,665
Mitchell	44,020	22,240	1,475
Beef Branch	39,050	48,790	1,420
Reeds	63,070	.....	1,130
Central City	49,400	13,860	1,100
Spring City-Spurgeon	44,020	13,270	680
Cave Springs	13,580	9,020	505
Totals	10,346,140	1,234,560	$215,795
Fifteen weeks	151,529,090	19,074,630	$3,063,890

The total value of the product of the zinc and lead mines of the district for the 15 weeks of the year is $3,063,890, passing the three-million point two weeks ahead of last year. The gain in shipments has amounted to 11,483,450 lb. zinc ore and 3,391,810 lb. lead ore.

Average Prices of Metals per lb., New York.

Mo.	Tin.		Lead.		Spelter.	
	1903	1904.	1503.	1904.	1903,	1904.
Jan...	28.83	28.845	4.075	4.347	4.865	4.863
Feb..	29.43	28.087	4.075	4.375	5.043	4.916
Mar..	30.15	28.317	4.442	4.475	5.349	5.057
April.	29.81	.....	4.567	.....	5.550	....
May .	29.51	.....	4.325	.....	5.639	....
June .	28.34	.....	4.210	.....	5.697	....
July..	27.68	.....	4.075	.....	5.602	....
Aug..	28.29	.....	4.075	.....	5.725	....
Sept..	26.77	.....	4.243	.....	5.686	....
Oct...	25.92	.....	4.375	.....	5.510	....
Nov..	25.42	.....	4.218	.....	5.338	....
Dec...	27.41	.....	4.162	.....	4.731	....
Year	28.09	.....	4.237	.....	5.400	....

NOTE.—The average price of spelter in St. Louis for the month of January, 1904, was 4.673c. per lb.; February, 4.717c.; March, 4.841c.

Average Prices of Copper.

Mo.	New York.				London.	
	Electrolytic.		Lake.		Standard.	
	1903.	1904.	1903.	1904.	1903.	1904.
Jan...	12.159	12.410	12.361	12.553	53.52	57.55
Feb...	12.778	12.063	12.901	12.245	57.34	56.57
Mar..	14.416	12.299	14.572	12.551	63 85	57.321
April.	14.454	.....	14.642	.....	61.72	.....
May..	14.435	.....	14.618	.....	61.73	.....
June .	13.842	.....	14.212	.....	57.30	.....
July..	13.094	.....	13.341	.....	56.64	.....
Aug..	12.962	.....	13.159	.....	58.44	.....
Sept..	13.205	.....	13.345	.....	56.82	.....
Oct...	12.801	.....	12.954	.....	55 60	.....
Nov..	12.617	.....	12.813	.....	56.30	.....
Dec. .	11.952	.....	12,084	.....	56.36	.....
Year	13.235	.....	13.417	.....	57.97	.....

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Mo.	1902.		1903.		1904.	
	London. Pence.	N. Y., Cents.	London Pence.	N. Y., Cents.	London, Pence.	N. Y., Cents.
Jan..	25.62	55.56	21.98	47.57	26 423	57.055
Feb..	25.41	55.09	22.11	47.89	26.665	57.592
Mar..	25.00	54.23	22.49	48.72	26,164	56,741
April.	24.34	52.72	23.38	50.56	.....	.....
May..	23.71	51.31	24.89	54.11	.....	.....
June .	24.17	52.36	24.29	52.86	.....	.....
July..	24.38	52.88	24.86	53.92	.....	.....
Aug..	24.23	52.52	25.63	55.36	.....	.....
Sept..	23.88	51.52	26.75	58.00	.....	.....
Oct...	23.40	50.57	27.89	60.36	.....	.....
Nov..	22.70	49.07	27.01	58.11	.....	.....
Dec...	22.21	48.03	25.73	55.375	.....	.....
Year	24.09	52.16	24.75	53.57	.....	.....

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

DIVIDENDS.

Company.	Latest Dividend. Payable.	Rate.	Total.	Total to date.
Annie Laurie, Utah.	Apr. 12	.50	$12,500	$325,000
*Bunker Hill & Sull.	Apr. 4	.15	45,000	1,673,000
*Central Lead, Mo.	Apr. 15	.50	5,000	405,000
*Daly West, Utah	Apr. 16	.65	117,000	3,959,000
†Doe Run Lead, Mo.	Apr. 15	1.50	22,500	672,072
*Dos Estrellas, Mex.	Apr. 15	4.40	13,200	635,775
*Four Oil, Cal.	Apr. 15	.01	2,087	64,710
*Homestake, S. D.	Apr. 25	.25	54,600	12,856,150
†Iowa, Colo.	Apr. 15	.01	16,667	370,171
†Jamison, Cal.	Apr. 18	.03	11,700	144,300
*Kendall, Mont.	Apr. 20	.05	25,000	430,000
*Lightner, Cal.	Apr. 20	.05	5,113	207,067
*Mines Co. of Am.	Apr. 20	.01¼	25,000	555,000
Montana Ore Purch.	Apr. 30	4.00	324,000	3,618,000
*Natividad, Mex.	Apr. 15	5.00	12,000	320,463
*Penna. Con., Cal.	Apr. 15	.10	5,150	507,675
*Silver King, Utah.	Apr. 10	.66⅔	100,000	7,750,000
‡United Copper, pf.	May 2	3.00	150,000	600,000
Swansea, Utah	Apr. 25	.03	3,000	333,500
†Vindicator, Colo.	Apr. 25	.03	33,000	1,148,000
*El Paso, Colo.	Apr. 25	.01	24,500	157,545
Ophir, Nev.	Apr. 6	.25	25,200	1,696,600

* Monthly. † Quarterly. ‡ Semi-annually.

ASSESSMENTS.

Company.	Delinquent.	Sale.	Amount.
Belcher, Nev.	Apr. 13	May 5	.10
Challar, Nev.	Apr. 12	May 3	.10
Confidence, Nev.	Apr. 20	May 11	.20
Con. Imperial, Nev.	Apr. 14	May 9	01
Crown Point, Nev.	Apr. 27	May 18	.10
Justice, Nev.	Apr. 22	May 11	.10
New Montezuma, Cal.	Apr. 29	.....	.02
New York Bonanza, Utah.	Apr. 11	May 2	.03
Overman, Nev.	Apr. 12	May 3	.10
Union Con., Nev.	Apr. 19	May 9	.15

STOCK QUOTATIONS

NEW YORK.

Company.	Par val.	Apr. 6 H.	Apr. 6 L.	Apr. 7 H.	Apr. 7 L.	Apr. 8 H.	Apr. 8 L.	Apr. 9 H.	Apr. 9 L.	Apr.11 H.	Apr.11 L.	Apr.12 H.	Apr.12 L.	Sales.
Acacia	$1					06								1,000
Alpha, s												07		500
Amalgamated, c	100	51⅛	50¼	51¼	50⅜	52¼	51½	51⅝	51⅛	52⅛	51⅜	51⅜	50	240,120
Anaconda, c	25	71	70¼	77	74	79	77⅛	78		80	78½	80⅛	78⅛	8,080
Andes, s	1							35						650
Belcher, s	3													
Best & Belcher, s	3													
Breece, s. l	25													
Bullion, s	1													
Caledonia, s	1	1.25												100
Challenge, s	25	30				25	24							500
Chollar, s., g	25			29										400
Chrysolite, s. l	50					04								200
C. K. & N., g	1													
Confidence	3													
Con. Cal. & Va., g. s	25	1.80		1.75		1.75						1.65		400
Con. Imperial, s	1													
Creede & C. Ck., g	1													
Cripple Creek, g	1													
Crown Point	25			20										300
Daly, g. s	25							2.15						20
Elkton, g	1	66				68	67					66		1,000
El Paso, g	1													
Gold Dollar, g	1													
Gould & Curry	1	44	42	40				37						1,000
Greene Con., c	10	14⅛	13⅜	15⅜	14¼	16⅜	15¼	15½	15	16½	15⅝	16¼	15⅜	51,300
Hale & Norcross	3	85		80										200
Homestake, g	100					51¾				50				40
Horn Silver	20	1.35												50
Isabella, g	1			31	30			30				30		3,300
Jack Pot, g	1													
Julia, s	1							08	07					500
Little Chief, g. s	50													
Mexican, s	3	2.40		2.30				2.25						500
Mollie Gibson, g	5													
Moon Anchor, q	5													
Occidental, s	3							80						100
Ontario, s. l	100													
Ophir, s	3					5.62½								100
Overman, s	2													
Pharmacist, g	1					03								1,000
Phœnix, g	1	10	07	13	10	11	10	11	10			14	12	19,900
Portland, g	1			1.80		1.85								485
Potosi, s	1			24		24						21		300
Quicksilver, Pf	100													
Savage, s	3													
Sierra Nevada, s	3													
Silver Hill, g. s	16							69						100
StandardCon., g. s	25													
Tennessee, c	1													
Union Con., g. s	10					86								100
Union Copper	100	⅝	⅜	1	⅝	1	⅝	1 1/16		1 1/16		⅞		8,800
United, com., c														
Vindicator														500
White Knob, c	10	8		8¼		8¾	8¼	8¼		8¾	8¼	8⅞	8½	1,750
Yellow Jacket, s	3			29										100

c—Copper. g—Gold. l—Lead. s—Silver. Total sales, 342,775 shares *Holiday.

BOSTON, MASS.

Company.	Par val	Apr. 6 H.	Apr. 6 L.	Apr. 7 H.	Apr. 7 L.	Apr. 8 H.	Apr. 8 L.	Apr. 9 H.	Apr. 9 L.	Apr.11 H.	Apr.11 L.	Apr.12 H.	Apr.12 L.	Sales.
AdventureCon., c	$25	2½		2½	2¼	2¾				5¼	5½	2½	2¼	335
Allouez, c	25	5¼	5	5⅜	5⅛	5⅛	5⅛	5⅛		5¼	5⅛	5	4 1/16	2,940
Amalgamated, c	100	51	50½	51¼	50¼	52⅛	51½	51¾	51¼	52⅛	51½	51⅜	50	31,767
Am. Gold Dredg	5													
Am. Z., L. & Sm	25	11⅜	11	11				10¾		11				460
Anaconda, c. s	25	17⅜		18¾	18⅜							19⅛	17⅜	1,330
Arcadian, c	25			40	30	50								725
Arnold, c	25									25				50
Atlantic, c	25	8⅛		8½	8¼	8		8		8		8¼		881
Bingham Con	50	23⅛	22¾	22½	22¼	23⅜	22⅜	23		23	22¾	22⅜	22⅛	1,550
Bonanza Dev. g	10													
British Col., c	5													
Calumet & Hecla	25			465	462	469½	455	470		470	460	470		101
Centennial, c	25	21½	20¾	21⅜	20⅜	22¼	21¼	21⅜		21½	21¼	21½	20⅞	6,023
Central Oil	25					7½				7⅛				300
Con. Mercur, g	5	58		58	57					55	53	55	53	1,325
Con. Zinc		10		12¼	10½	12		12½	12¼	12¼				378
Copper Range	100	44	43½	44	41⅜	44⅞	43½	44	43½	44¼	43¾	44⅛	43¼	8,176
Daly West, g. s. l	20	28	26½	28	27	27	26¼	24	25	25	24	24¼	23½	5,018
†Dominion Coal	100	60		62		64½	63	64½	63¼	66⅛	65	65⅛		695
Preferred	100	109		109		110	109	110		110				220
Dominion I. & S	100	9¼		9¼		9¼	9	10	9½	10¾	10	10½	10	2,115
Elm River, c	12			2½										100
Franklin, c	25	8	7⅝	8		8¼	8			8⅛	8	8¼	8	485
Granby Con	10	2 1/8	2¾	3		3½	3							9,100
Guanajuato Con	5	1¾	1¼	2	1¼	2	1⅝	1 1/16	1⅛	1 3/16	1⅛	1⅝		6,756
Isle Royal Con	25	7½		7		7¼						7¾	7¼	375
Mass Con., c	25			4½	4⅛			4		4½		4⅛		129
Mayflower, c	25													
Michigan, c	25	6				6½	6					5½		320
Mohawk, c	25	42½	41¼	44	42	44¼	43¼	44	43⅛	43⅞	43¼	44	42½	3,051
Mont. Coal & C	25											2½		100
Mont'l & Boston	5	50						68¾		75		75		350
New Idria, q	5													
Nova Scotia St	100													
Preferred	100													
Old Colony, c	25			1										114
Old Dominion, c	25	14⅜	14	14¼	13¾					13¾		13	12½	1,475
Osceola, c	25	60	59½	59¾	59	60¾	59⅜	60	59½			59		808
Parrot, s. c	10	25⅜		25½	25¼	26	25¾			25¾	25¼	25		1,331
Phœnix Con, c	25	2		2		2¼	2	2		2		2		923
Quincy, c	25	89½	88	89½	89	89	88	88				85		148
Rhode Island, c	25			1		1¼						1⅛		445
Santa Fe, g. c	10			1¾	1¾	1¾								625
Shannon, c	10	9	8¼	8 1/16	8⅝	8⅝	8½	8¾	8½	8¾	8⅝	8⅝	8½	5,143
Tamarack, c	25	100½	99	100		100		96		98		95		196
Tecumseh, c	25													
Tennessee, c	25													
Trinity, c	25	4¼	4⅛	4¼	4⅛	4½	4⅛	4½	4¼	4½	4¼	4⅜	4¼	2,405
Union, c	25							2½						20
United States, g	10	21¼	20⅝	21¼	20⅞	21⅜	20¾	21⅜	21	21¼	21	21	20¾	4,859
U. S. Coal & Oil	25	9⅝	9¾	9¼				9¼	9¼	9⅝	9¼	9¼	9¼	718
Utah Con., g. c	5	34⅜	33⅝	34¼	33⅞	34¼	34	34	33⅞	34⅛	33⅝	34	33⅞	3,065
Victoria, c	25	3⅜	3¼	3⅜	3 5/16	3½	3 5/16			3⅜	3¼	3¼		920
Winona, c	25	7¼	7	7¼	7	7¼	73			7	6 1/16			1,735
Wolverine, c	25	74	71½	73¾	73	73½	7⅛	73	72½	73	72	73⅜	73	1,165
Wyandot, c	25							75				75		150

*Holiday. †Ex-dividend. ‡Assessment Paid. Total sales, 111,405 shares.
c—Copper g—Gold. l—Lead. q—Quicksilver. s—Silver.

Duluth, Minn.

Company	Par Val.	Bid.	Asked.	Company	Par Val.	Bid.	Asked.
Calumet & Arizona	$10	$110	$111	Lake Sup. & Pitts Dev.	$10	$130	$135
Calumet & Bisbee	10	7.50	8.00	Pitts. & Duluth Dev.	15	50.00	51.00
Calumet & Cochise	10	7.50	8.00	Shakespeare			.20
Calumet & Pittsburg	10	33.50	35.00	United Mexican			.50
Higgins Development	10	3.00		Wolverine & Arizona	10	4.00	
Junction Development	15	14.00	14.50	Yaqui	10		1.50

COAL, IRON AND INDUSTRIAL STOCKS.

Company.	Par val.	Apr. 6 H.	Apr. 6 L.	Apr. 7 H.	Apr. 7 L.	Apr. 8 H.	Apr. 8 L.	Apr. 9 H.	Apr. 9 L.	Apr. 11 H.	Apr. 11 L.	Apr. 12 H.	Apr. 12 L.	Sales
Allis-Chalmers	$100					7⅞								100
Preferred	100	44										43		40
Am. Agr. Chem	100													
Preferred	100					72								100
Am. Sm. & Ref	100	48⅛		49⅛	48¾	49¼	49	48⅞	48¾	48⅞	48¾	49		2,700
Preferred	100	83⅜	83¼	83⅜	92¾	93		93		93¼		93½	93⅜	4,497
Col. Fuel & I	100	32½	30¼	33⅛	31⅞	32¾	32	32⅝	31¾	33⅜	32	33½	22⅛	14,205
Preferred	10													
Col. & H. C. & I	100	13½	12¾	13	12¾	13⅝	13			13½	13⅜			1,620
†Crucible Steel	100	5	4⅞	5⅛	5	5				4⅞		4⅞	4¾	715
*Preferred	100			32½	32	32⅛	31⅞	31¾		32½				773
General Chem	100													
Preferred	100													
*Mong. R. Coal	50													
*Preferred	50	25½		26		26				25½		26		66
National Lead	100			15¼	15	15¼		15¼		16⅝	15⅜	17¼	16⅜	8,400
Preferred	100	87				87						89	87	1,175
*Phila. Nat. Gas	100							39						50
*Preferred	100													
*Pittsburg Coal	100	16⅜				16¼				16¼		17⅛	17	1,525
*Preferred	100	60⅜	60¼	60⅛		60⅛	60	60⅛		60⅛		62⅛	60⅛	1,719
Republic I. & S	100	8	7⅞	8	7⅞	7⅝	7⅞			7¾		7⅝	7⅞	3,630
Preferred	100	47¾	46⅜	48	47¾	48	47⅞	47		47⅞	47			7,875
Sloss-Shef S. & I	100	40¾	39¾	41		41¼	41			41⅜		41⅜	41¼	1,635
Preferred	100	84	83¾											200
‡Standard Oil	100					632	625	634	627½	635	634¼			39
Tenn. C. I. & R. R	100	40¾	40¼	41¼	40¼	41	39⅞	39⅝		41	40⅜	41	39¼	13,555
U. S. Red. & Ref	100													
Preferred	100													
U. S. Steel Corp	100	11⅝	11¼	11⅞	11⅝	12	11⅜	11⅝	11½	11⅞	11⅝	11¾	11⅜	108,238
Preferred	100	60⅝	59⅝	62¼	60⅞	62½	61¼	61¾	61¼	62⅜	61¾	62⅛	60¾	340,361
Va.-Car Chem	100	30½	30¼	30½	30¼	29⅞	28⅜	29¼		29				3,000
Preferred	100			104										116

*Pittsburg exchanges. †Holiday. ‡Ex. dividend. Total sales, 516,155.

COLORADO SPRINGS, COLO.

Company.	Par Val	Apr. 2 H.	Apr. 2 L.	Apr. 4 H.	Apr. 4 L.	Apr. 5 H.	Apr. 5 L.	Apr. 6 H.	Apr. 6 L.	Apr. 7 H.	Apr. 7 L.	Apr. 8* H.	Apr. 8* L.	Sales
Acacia	$1	.06¾	.06	.06¾	.06	.06⅝	.06½	.07	.06	.06¾	.06½			
American Con	1													
Anaconda	5	.14	.11	.14	.11	.13	.11	.13	.11	.13	.11			
Colo. City & M	1	.02½		.02¾	.02½	.02⅞	.02½	.02⅝	.02⅜	.02⅝	.02⅜			2,000
C. K. & N	1	.21½		.23	.21⅝	.23	.21½	.24	.21½	.25	.21½			
Cripple Ck. Con	1	.07	.06⅝	.07	.06¾	.07⅛	.06¾	.07¼	.07⅛	.07¾	.07¼			7,000
Des Moines	1	.02		.02		.02⅛	.02	.02⅛	.01⅞	.02⅛	.02			
Doctor Jack Pot	1	.07⅛	.06½	.07¼	.06¾	.07⅛	.03½	.08		.07	.06¾			
Elkton Con	1	.64	.61	.64	.62¾	.64	.62	.65	.64	.65¼	.65			4,900
El Paso	1	.78	.77½	.77¾	.77⅛	.78¼	.78	.78	.77½	.78	.77½			19,166
Gold Dollar Con	1	.05¼	.05	.06½	.05	.05⅛	.05	.05¼	.05½	.05⅝	.05¼			33,000
Gold Sovereign	1	.04½	.04	.04¾	.04	.04¼	.04	.04¼	.04	.04⅝	.03⅞			
Golden Cycle	1	.43⅜	.40	.50	.40	.50	.40	.44½	.40	.50	.43			1,000
Golden Fleece	1	.02		.02		.02		.02		.02				
Hart	1	.02½		.02½		.02⅜		.04	.02	.02				
Isabella new	1	.28⅛	.28	.28¾	.28	.29	.27	.28⅛	.28	.28½	.27¾			1,000
Jack Pot	1	.05		.05		.09		.05		.05				
Keystone	1	.04	.03½	.04	.03¼	.01	.03¼	.03⅛		.03				1,000
Last Dollar	1	.45		.45		.45		.45		.45				
Lexington	1	.04	.03½	.04½	.03⅝	.04	.03⅝	.04½	.03⅞	.04½	.03⅞			
Little Puck	1	.03⅜	.03⅛	.03⅝	.03½	.03⅛	.03⅜	.03⅛	.03⅜	.03⅝	.03⅛			22,000
Mollie Gibson	1	.06	.05	.06	.05	.06	.05	.06	.05	.06	.05			
Moon-Anchor	5	.09	.07⅜	.09	.07	.08	.07	.09	.07¼	.09	.07⅝			2,000
New Haven	5	.02⅞	.02⅜	.03	.02⅜	.02⅞	.02⅜	.02⅞	.02⅜					
Old Gold	1	.11	.10¼	.10⅞	.10¼	.10	.09¾	.09¾	.09¼	.10¼				8,500
Pharmacist	1	.03⅞		.04	.03½	.03½	.03⅜	.03⅝	.03⅜	.03⅝	.03½			3,000
Pinnacle	1	.03½		.03½		.03½		.03⅝		.03⅝				
Portland	1	1.75	1.50	1.80	1.60	1.50		1.72		1.80	1.65			1,450
Vindicator Con	1	.60		.61	.60½	.70	.65½	.66	1.68	.68	.67			8,300
Work	1	.06¾	.06	.06¾		.06½	.06	.06¼	.65½	.06¾	.06			
									.06					

*Quotations not received. Total sales, 114,316 shares.

COLORADO SPRINGS (By Telegraph).

Company.	Apr. 11 H.	Apr. 11 L.	Apr. 12 H.	Apr. 12 L.
Anaconda	.07½	.07⅜	.13	.11
Cripple Ck Con	.23½	.21½	.24	.22
C. K. & N	.07⅛	.06½	.08	.07½
Doctor-Jack Pot	.67	.66¼	.07	.06
Elkton Con	.80	.79½	.66¾	.66¼
El Paso	.05¼	.05	.80	.78½
Gold Dollar Con	.04¾	.04	.05⅜	.05
Gold Sovereign	.20½	.28	.04⅜	.04
Isabella			.29	.28
Jack Pot				
Last Dollar				
Mollie Gibson			.05½	.04½
Moon Anchor	.09	.07⅛	.09	.07½
Old Gold	.10¼	.10	.11¼	.10¾
Pharmacist	.03⅝	.03½	.03¾	.03½
Portland	1.81	1.70	1.80	1.71
Vindicator	.80	.70	.75	.70
Work	.07	.06⅞	.06⅜	.06¾

SAN FRANCISCO.

Company.	Location.	Mar. 31 H.	Mar. 31 L.	Apr. 1 H.	Apr. 1 L.	Apr. 2 H.	Apr. 2 L.	Apr. 4 H.	Apr. 4 L.	Apr. 5 H.	Apr. 5 L.	Apr. 6 H.	Apr. 6 L.	Sales
Central Eureka	Cal													
Golconda	Ore													
Golden Anchor	Nev													
Hannapah	Nev													
Lightner Mg. Co.	Nev													
MacNamara	Nev	.22		.21	.19	.20	.19	.20	.19	.19				14,100
Mont. Tonopah	Nev	1.40	1.37	1.55	1.50	1.52	1.50	1.42	1.35	1.35	1.00	1.35	1.00	15,300
Penna. C. M. Co	Cal													
South Eureka	Cal													
Ton. Belmont	Nev	.62	.60	.60	.59	.60		.60		.60				11,450
Ton. Midway	Cal	.36	.35	.38	.33	.38	.37	.36				.37		11,200
Ton. Mg. Co	Nev					8.00	7.75	7.75						300
Ton. North Star	Nev			.32	.31	.33								1,000
Ton. & Salt Lake	Nev													
Ton. Superior	Nev													
Wild Goose	Ala													

San Francisco and Tonopah Mining Exchange.
Total sales, 53,350 shares.

SAN FRANCISCO (By Telegraph).

Company.	April 11.	April 12.
Belcher	33	32
Best & Belcher	2.10	2.10
Caledonia	.81	.69
Challenge Con	.24	.23
Chollar	.25	.24
Confidence	.75	.74
Con. California & Virginia	1.70	1.65
Crown Point	.16	.15

Name of Company.	April 11.	April 12.
Gould & Curry	.36	.30
Hale & Norcross	.85	.85
Mexican	2.15	2.05
Ophir	5.12½	5.12½
Overman	.31	.31
Sierra Nevada	.67	.64
Union Con	.78	.72
Yellow Jacket	.26	.25

STOCK QUOTATIONS

MEXICO.* Mar. 29

Company.	Shares Issued.	Prices. Bid.	Prices. Ask.
Durango:			
Ca. Min. de Penoles..	2,500	$3,600	$3,800
San Andres de la Sierra	200	10,000	.....
Guanajuato:			
Angustias, Pozos....	2,400	45	50
Cinco Senores y An., aviadoras.....	2,000	40	50
Cinco Senores y An., aviada	400	40	50
Providencia, San Juan de la Luz.....	6,000	65	75
Queensland y Australia.....	300	55	75
Guerrero:			
Delfina, 1st serie.....	2,500	52	56
Delfina, 2nd serie....	2,500	35	40
Garduno y Anexas...	7,200	30	40
Hidalgo:			
Amistad y Condordia	9,600	83	84
Carmen, aviada.....	1,100	50	90
Guadalupe Fresnillo Mill	1,000	170	200
Guadalupe Fresnillo Mine.....	1,400	70	80
La Blanca, aviadora.	1,536	.....	.....
La Blanca, aviada....	768	.....	.....
La Reina y An., aviadora.....	5,600	5	8
Luz de Maravillas, aviadas.....	1,100	.....	20
Maravillas y An., aviador.....	1,680	120	140
Maravillas el Lobo ..	1,000	130	180
Palma y An., aviador.....	1,800	8	16
Real del Monte	2,554	.....	.....
Refugio, aviada.....	12,800	680	740
Santa Anay An., aviadora.....	1,800	90	95
Santa Anay An., aviada.....	600	30	40
Sta. Gertrudis y An., aviadas.....	9,600	13	15
Sta. Gertrudis y An., aviadora.....	28,800	83	84
Santo Tomas Apostol aviadoras.....	5,100	2	3
San Felipe de Jesus, aviadora.....	3,600	16¼	19
San Felipe de Jesus, aviada	1,200	6	10
San Rafael y An., Trompillo.....	1,200	1,710	1,725
San Rafael y An., aviada.....	1,200	670	681
Soledad, aviada.....	670	670	680
Sorpresa, aviada.....	960	280	285
.....	.....	.....	.....

Name of Company.	Shares Issued.	Prices. Bid.	Prices. Ask.
Mexico:			
Alacran.....	2,400	20	28
Aldebarren.....	2,000	25	30
Buen Despacho.....	3,000	38	40
Dos Estrellas.....	3,000	1,630	1,700
La Esperanza (El Oro.).....	3,000	1,500	1,500
La Reformia, aviadores.....	2,000	20	25
Providencia, pagadoras.....	1,600	.....	.....
Providencia, liberadas.....	900	.....	.....
Santa Ana, Esperanza.....	2,400	90	.....
Michoacan:			
Luz de Borda, aviadora.....	3,000	55	62
Luz de Borda, aviado.....	1,000	25	33
Santiago y An., Tlal..	4,000	4	6
Nuevo Leon;			
La Fraternal.....	1,000	580	620
Norias de Bajan.....	1,000	880	920
San Luis Potosi:			
Concepcion y An.....	3,000	64	70
El Barreno, aviadora.	2,000	55	58
Sta. Maria de la Paz..	9,800	145	150
San Diegoy Annexas.	2,400	8	10
Zacatecas:			
Asturiana y An.....	2,500	20	30
Candelaria y Pinos..	2,500	130	140
Cubiertas.....	2,400	.....	.....
Esperanza y An.....	2,400	6	8
Lourdes.....	2,500	22	27
Luz de Minillas, pagadoras.....	2,000	15	30
Nueva Quebradilla, aviadoras.....	2,400	20	40
Nueva Quebradilla, aviadas.....	800	20	40
San Carlos y Annexas	2,500	57	60
Sta. Maria de Gaud..	2,500	60	70
Miscellaneous:			
Bartolome de Medina	2,000	78	84
Guadalupe Hacienda	20,000	.....	.....
La Luz Hac. (Pachuca.).....	3,750	.....	.....
La Reina (Chihuahua.).....	192	.....	.....
Naica (Chihuahua.)..	100	11,000	13,000
Natividad (Oaxaca) aviadora.....	1,800	950	100
Natividad (Oaxaca) aviadas.....	600	.....	.....
San Francisco Hac...	6,000	69	70
Santa Ana Huantia Morelos.....	4,000	.....	.....
Union Hacienda.....	3,000	215	230

*Values are in Mexican currency.

TORONTO, ONT. April 9

Company.	Par val	Prices. High.	Prices. Low.	Sales
Black Tail, g.....	$1	.03	.02	.....
Cariboo-McKin	1	.02½	.01½	.....
Cariboo-Hydr.....	1	.75	.....	.....
Center Star, g. s....	1	.28	.25	.....
Crows Nest, C.C....	100	.....	.....	.....
Dominion Coal	100	.....	.....	.....
Dominion S. & I. ...	100	.....	.....	.....
Fairview, g. s.....	1	.04	.02½	.....
Giant, g. s.....	1	.05	.04	.....
Deer Trail, g. s....	1	.02	.01	.....
Iron Mask, g. s....	1	.06	.05	.....
Morrison, g. s.....	1	.93	.01	.....
.....	.....	.....	.....	.....

Company.	Par val	Prices. High.	Prices. Low.	Sales
Granby Smelter...	$10	4 25	3.40	.....
Mountain Lion, g.	1	.15	.09	.....
North Star, g. s..	1	.10	.07	.....
Nova Scotia Steel..	100	.....	.....	.....
Payne, s. l.....	1	.11	.07	.....
Rambler Carib ...	1	.29	.23	.....
Republic, g.....	1	.02	.....	.....
St. Eugene, g. s..	1	.45	.38	.....
Virtue, g. s.....	1	.....	.....	.....
War Eagle Con....	1	.15	.10	.....
Sullivan, g. s.....	1	.05	.04	.....
Winnipeg, g. s....	1	.03	.....	.....
Wonderful, g. s..	1	.03	.....	.....

g—Gold. l—Lead. s—Silver. Total sales, none.

SALT LAKE CITY.* April 9

Company	Par Val	High	Low	Sales.
Ajax	10	.....	.....	600
Bullion-Beck...	.....	.....	.....	200
Butler Liberal.	.....	.14	.12¼	3,525
Carisa.....	.....	.06	.06	100
Century.....	1	71½	69½	1,750
Con. Mercur...	1	.53	.53	200
Daly.....	20	2.43	2.40	50
Daly-Judge	.....	.....	.....	.....
Daly West....	½	27.00	25.30	640
Grand Central.	.....	4.37	4.35	400
Ingot	1	.....	.....	.....
Joe Bowers....	.....	.....	.....	.....
.....	.....	.....	.....	.....

Name of Company	Par Val	High	Low	Sales.
L. Mammoth..	½	32½	.30½	1,500
Mammoth.....	.....	.....	.....	.....
May Day.....	.....	.05⅝	.05⅜	4,000
Martha Wash...	.....	.01⅝	.01¼	8,628
N. Y. Bonanza	5	.09	.08¼	8,700
Silver Shield...	1	.....	.....	.....
Star Con.....	.....	.15	.14½	7,000
Tetro.....	.....	.31	.29	7,200
Uncle Sam, Con	1	.13¼	20	8,200
Wabash.....	.....	.04	.04	3,000
Yankee Con....	.....	.41	.41	100
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....

*By our Special Correspondent. All mines are in Utah. Total sales, 54,993 shares.

PHILADELPHIA, PA

Company.	Par val.	Apr. 6 H.	Apr. 6 L.	Apr. 7 H.	Apr. 7 L.	Apr. 8 H.	Apr. 8 L.	Apr. 9 H.	Apr. 9 L.	Apr. 11 H.	Apr. 11 L.	Apr. 12 H.	Apr. 12 L.	Sales
Am. Cement.	$10	.....	.....	.....	.....	.....	.....	.....	.....	7⅛	.....	.....	.....	100
Cambria Iron	50	.....	.....	45	.....	45½	.....	45⅛	.....	.....	.....	46	45½	223
Cambria Steel	50	20⅛	20⅜	20⅞	20⅛	20⅞	20¾	20⅝	20½	.....	.....	20½	20¼	3,866
Pa. Steel, pfd	100	.....	.....	.....	.....	80	.....	.....	.....	.....	.....	80	.....	88
Susq. I. & S..	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
United Gas I.	50	83	.....	84⅛	83	84¼	84	84	.....	84⅛	83¾	84	.....	2,159
Lehigh Nav'n	50	.....	.....	68	.....	.....	.....	.....	.....	.....	.....	67	.....	124
Philadelphia .	50	39	....	39⅛	38⅞	39⅛	39	39	.....	39⅛	39	39	38⅞	4,252
U.S. Steel.....	100	11⅛	11¼	11¾	1 1⅛	11⅞	11⅛	11⅝	.....	11¾	.....	11¾	11⅝	7,780
U.S. Steel. pf.	100	60⅛	59½	62⅜	60¼	32¼	61½	61¾	.....	62⅜	61¾	61⅞	60⅞	13,021

*Holiday. Total sales 36,613.

LONDON. Mar. 30

Company.	Shares Issued.	Par value.	Latest dividend. Amt.	Latest dividend. Date.	Quotations. Buyers.	Quotations. Sellers.
American:		£. s. d.	s. d.		£ s. d.	£ s. d.
Alaska-Treadwell.....	200,000	5 0 0	3 0	Apr., 1904	4 10 0	4 15 0
Anaconda.....	1,200,000	5 0 0	2 0	Nov., 1903	3 7 6	3 10 0
Camp Bird.....	820,000	1 0 0	9	Feb., 1904	1 3 9	1 6 3
Copiapo.....	112,500	2 0 0	6 10	May, 1903	1 0 0	1 5 0
De Lamar.....	80,000	1 0 0	2 0	Oct., 1903	10 0	12 6
El Oro.....	1,080,000	1 0 0	9	Jan., 1904	1 1 3	1 3 9
Frontino & Bolivia.....	128,362	1 0 0	3 0	July, 1901	10 0	12 6
Le Roi.....	200,000	5 0 0	5 0	Nov., 1899	1 12 6	1 15 0
Le Roi No. 2.....	120,000	5 0 0	1 0	Feb. 1904	16 3	18 9
Montana.....	657,128	1 0 0	6	April, 1899	9	1 0
Palmarego & Mexican..	445,000	1 0 0	rts.	April, 1903	7 9	8 3
Standard.....	500,000	4 0	2½	Sept., 1903	2 6	3 6
Stratton Independence.	1,000,007	1 0 0	6	Dec., 1903	3 6	4 0
St. John del Rey..	546,265	1 0 0	6	Dec., 1903	14 6	15 0
Tomboy.....	300,000	1 0 0	1 0	June, 1902	1 5 0	1 10 0
Ymir.....	200,000	1 0 0	1 0	Mar., 1902	1 3	3 9
European:						
*Linares	15,000	3 0 0	5 0	Mar., 1904	3 15 0	4 5 0
Mason & Barry	185,172	1 0 0	11 0	May, 1903	3 12 6	3 17 6
Rio Tinto.....	325,000	5 0 0	37 6	Apr., 1904	51 7 6	51 12 6
Rio Tinto, preferred....	325,000	5 0 0	2 6	Apr., 1904	6 0 0	6 5 0
Tharsis.....	625,000	2 0 0	7 0	May, 1904	4 12 6	4 17 6
West Australian:						
Associated	495,388	1 0 0	2 0	Jan., 1904	2 10 0	2 12 6
Cosmopolitan.....	400,000	1 0 0	1 0	May, 1903	14 0	14 6
Golden Horseshoe.....	300,000	5 0 0	6 0	Apr., 1904	8 1 3	8 3 9
*Great Boulder.....	1,750,000	2 0	9	Mar., 1904	1 5 9	1 6 3
Gt. Boulder Persever'ce	1,490,007	1 0 0	1 3	Feb., 1904	1 4 6	1 5 0
Great Fingall.....	250,000	1 0 0	7 0	Apr., 1904	8 6 3	8 8 9
Ivanhoe.....	200,000	5 0 0	7 6	Apr., 1904	8 7 6	8 10 0
Kalgurli.....	120,000	1 0 0	2 6	Apr., 1904	5 10 0	5 12 6
Lake View	250,000	1 0 0	rts.	Aug., 1902	1 0 0	1 2 6
*Oroya-Brownhill	450,000	1 0 0	2 6	Mar., 1904	3 7 6	3 8 9
Miscellaneous:						
*Brilliant Central	100,000	1 0 0	1 0	Apr., 1904	2 17 6	3 2 6
Briseis	600,000	1 0 0	.. ..	.....	7 6	8 6
Broken Hill.....	960,000	8 0	1 6	Feb., 1904	1 14 0	1 15 0
Mt. Lyell	275,000	3 0 0	4 3	Sept., 1903	16 6	17 6
Mt. Morgan.....	1,000,000	1 0 0	3	Apr., 1904	2 2 6	2 5 0
Waihi.....	497,412	1 0 0	2 6	Mar., 1904	5 3 9	5 6 3
Indian:						
Champion Reef.....	513,832	10 0	6 6	Jan., 1904	1 15 0	1 16 3
Mysore.....	568,043	10 0	5 6	Mar., 1904	6 8 9	6 11 3
*Nundydroog.....	484,000	10 0	1 8	Mar., 1904	1 18 9	2 1 3
Ooregum	343,000	10 0	1 3	Apr., 1904	1 1 3	1 3 9
Ooregum, pfd.....	240,000	10 0	1 3	Apr., 1904	1 8 9	1 11 3
South African:						
Angelo.....	600,000	1 0 0	4 0	Feb., 1904	6 2 6	6 7 6
Bonanza.....	200,000	1 0 0	10 0	Feb., 1904	1 16 3	1 18 9
British South Africa....	4,436,019	1 0 0	rts.	May, 1899	1 11 5	1 13 7
Cape Copper.....	300,000	2 0 0	4 0	Jan., 1904	2 15 0	3 0 0
Cape Copper, pfd.....	75,000	2 0 0	1 9	Jan., 1904	2 15 0	3 0 0
City & Suburban	340,000	4 0 0	8 0	Feb., 1904	6 5 0	6 7 6
Consol. Gold-Fields....	2,000,000	1 0 0	.. ..	.....	5 11 3	5 13 9
Crown Reef.....	120,000	1 0 0	18 0	Apr., 1904	16 10 0	17 0 0
*De Beers, preferred...	800,000	2 10 0	10 0	Jan., 1904	18 12 6	18 8 9
*De Beers, deferred....	1,000,000	2 10 0	15 0	Jan., 1904	19 1 3	19 3 9
East Rand.....	880,000	1 0 0	5 0	Aug., 1903	6 6 3	6 8 9
Ferreira.....	90,000	1 0 0	3 0	May, 1904	18 15 0	19 5 0
Geldenhuis	200,000	1 0 0	6 0	Feb., 1904	5 1 3	5 3 9
Geduld.....	400,000	1 0 0	rts.	Mar., 1902	5 10 0	5 12 6
Henry Nourse.....	125,000	1 0 0	10 0	Feb., 1904	8 10 0	8 12 6
Jubilee.....	50,000	1 0 0	5 0	Feb., 1904	4 0 0	4 5 0
Jumpers.....	100,000	1 0 0	2 6	May, 1901	2 10 0	2 12 6
Langlaagte..	470,000	1 0 0	2 0	Feb., 1904	3 6 3	3 8 9
May.....	288,750	1 0 0	3 6	Feb., 1904	3 15 0	3 17 6
Meyer & Charlton.....	100,000	1 0 0	5 0	Jan., 1904	4 17 6	5 2 6
Modderfontein	290,000	1 0 0	rts.	Apr., 1902	7 10 0	7 12 6
Namaqua	94,331	2 0 0	3 0	Dec., 1903	2 17 6	3 2 6
New Jagersfontein..	200,000	5 0 0	10 0	Apr., 1904	27 15 0	28 5 0
*New Primrose...	325,000	1 0 0	3 0	Mar., 1904	3 10 0	3 12 6
Rand.....	1,795,956	5 0	4 0	Aug., 1902	9 3 9	9 6 3
Robinson.....	750,000	5 0 0	5 6	Feb., 1904	9 0 0	9 5 0
Robinson Deep.....	950,000	1 0 0	3 0	Jan., 1904	5 0 0	5 2 6
Rose Deep	425,000	1 0 0	2 6	Feb., 1904	7 3 9	7 6 3
Salisbury	100,000	1 0 0	2 0	Mar., 1899	1 10 0	1 15 0
Village.....	400,000	1 0 0	3 0	Feb., 1904	6 2 6	6 7 6
Wemmer.....	80,000	1 0 0	10 0	Jan., 1904	9 15 0	10 5 0

*Ex-dividend.

LONDON (By Cable.)*

Company.	Apr. 5 £.	Apr. 5 s.	Apr. 5 d.	Apr. 13 £.	Apr. 13 s.	Apr. 13 d.
Anaconda.....	3	7	6	4	0	0
British So. Africa.	1	15	0	2	2	6
Camp Bird.....	1	4	9	1	5	9
Con. Gold Fields.	5	17	6	6	13	9
De Beers.....	19	17	6	19	12	6
East Rand.....	6	11	3	7	9	4½

Company.	Apr. 5 £.	Apr. 5 s.	Apr. 5 d.	Apr. 13 £.	Apr. 13 s.	Apr. 13 d.
El Oro.....	1	1	3	1	1	3
Modderfontein....	6	16	3	5	6	3
Rand Mines.....	9	11	3	10	3	9
Rio Tinto	52	12	6	52	17	6
Simmer & Jack...	1	10	0	1	14	9
Tomboy.....	1	7	8	1	7	6

*Furnished by Wm. P. Bonbright & Co., 15 Wall St., New York.

PARIS. Mar. 24

Company.	Location.	Capital Stock.	Par value.	Latest divs.	Prices. Opening.	Prices. Closing.
		Francs.	Fr.	Fr.	Fr.	Fr.
Anzin, Coal.....	France	.....	.....	290.00	5,280.00	5,330.00
Boleo, c.....	Lower Cal.....	12,000,000	500	62.50	1,670.00	1,755.00
Champ d'Or, g.....	S. Africa.....	3,375,000	25	3.75	18.00	17.00
Courrieres, Coal.....	France	600,000	500	110.00	2,690.00	2,730.00
Fraser River, g.....	Brit. Col.....	250,000	25	.....	5.50	5.50
Huanchaca, s.	Bolivia.....	40,000,000	125	2.50	66.75	66.25
Laurium, z. l....	Greece.....	16,300,000	500	25.00	320.00	316.00
Malfidano, z.....	Italy	12,500,000	500	50.00	590.00	585.00
Metaux, Cie. Fran. de.....	France	25,000,000	500	22.50	482.00	470.00
Mokta-el-Hadid, i. l.....	Algeria	18,312,000	500	40.00	849.00	875.00
Nickel, n.....	N. Caledonia..	15,000,000	250	22.50	518.00	520.00
Penarroya, Coal	Spain.....	.....	500	45.00	1,095.00	1,089.00
Vielle Montagne z.....	Belgium..	9,000,000	30	30.00	690.00	690.00
.....	.....	.....	.....	.....	.....	.....

c—Copper. g—Gold. i—Iron. l—Lead. n—Nickel. o—Oil. s—Silver. z—Zinc.

ST. LOUIS, MO.* April 9

Name.	Par Val.	Prices. Bid.	Prices. Ask.
Am.-Nettie, Colo....	$10	$0.08	$0.25
Catherine Lead, Mo.	10	1.40	2.00
Central Coal & C....	100	60.00	61.25
Central C. & C., pf..	100	70.00	73.00
Central Lead, Mo...	100	110.00	115.00

Name.	Par Val.	Prices. Bid.	Prices. Ask.
Columbia Lead, Mo.	$10	$3.50	$4.50
Con. Coal, Ill.....	100	17.00	18.00
Doe Run Lead Mo.	100	110.00	115.00
Granite Bimet. Mt..	10	.36	.40
St. Joe Lead, Mo....	10	14.50	16.00

*By our Special Correspondent.

CHEMICALS, MINERALS, RARE EARTHS, ETC.—CURRENT WHOLESALE PRICES.

(See also Market Reviews.)

ABRASIVES—		
Carborundum, f.o.b. Niagara Falls, Powd.,	lb.	$0.08
Grains	"	.10
Corundum, N. C	"	.07@.10
Chester, Mass	"	.04½@.05
Barry's Bay, Ont	"	.07½@.09½
Mont. f.o.b. Chicago	"	.07@.07½
Crushed Steel, f.o.b. Pittsburg	"	.05½
Emery, in kegs: Turkish flour	"	.03¾
Grains	"	.05@.05½
Naxos flour	"	.03½
Grains	"	.05@.05½
Chester flour	"	.03½
Grains	"	.05@.05½
Peekskill, f.o.b. Easton, Pa., flour	"	.01½
Grains, in kegs	"	.02¼
Crude, ex-ship N. Y.: Abbott (Turkey)	lg. ton	26.50@30.00
Kuluk (Turkey)	"	22.00@24.00
Naxos (Greek) h.gr.	"	26.00
Garnet, per quality	sh. ton	25.00@35.00
Pumice Stone, Am. Powd	lb.	.01½@.02
Italian, powdered	"	.01½
Lump, per quality	"	.04@.05
Rottenstone, ground	"	.02½@.04½
Lump, per quality	"	.06@.20
Rouge, per quality	"	.10@.30
Steel Emery, f.o.b. Pittsburg	"	.07
ACIDS—		
Boracic, crystals	"	.10¾@.11
Powdered	"	.11¾@.11½
Carbonic, liquid gas	"	.12½
Chromic, crude	"	.20
Hydrofluoric, 30%	"	.03
48%	"	.05
60%	"	.11
Sulphurous, liquid anhy. f.o.b. Bound Brook, N. J.	"	.06
ALCOHOL—Grain	gal	2.47@2.49
Refined wood, 95@97%	"	.50@.55
Purified	"	1.25@1.30
ALUM—Lump	100 lbs.	1.70
Ground	"	1.80
Porous	"	1.00
Powdered	"	3.00
Chrome, com'l	"	2.75@3.00
ALUMINUM—		
Nitrate	lb.	1.50
Oxide, com'l, common	"	.06½
Best	"	.20
Pure	"	.80
Hydrated	100 lbs.	2.60
Sulphate, com'l	"	1.25@1.50
AMMONIA—		
Aqua, 16°	lb.	.03
18°	"	.03¼
20°	"	.03¾
26°	"	.04½
AMMONIUM—		
Carbonate, lump	"	.07½
Powdered	"	.08¼
Muriate gram	"	.05⅝
Lump	"	.09½
Nitrate, white pure (99%)	"	.12
Phosphate, com'l	"	.09
Pure	"	.12
ANTIMONY—Glass	"	.30@.40
Needle, lump	"	.05½@.06
Powdered, ordinary	"	.05¾@.07¾
Oxide, com'l white, 95%	"	.03½
Com'l white, 95%	"	.12
Com'l gray	"	.07
Sulphuret, com'l	"	.16
ARSENIC—White	"	.03½@.03¾
Red	"	.03⅝@.06½
ASPHALTUM—		
Barbadoes	"	.02½@.03
Ventura, Cal	sh. ton	32.00
Cuban	lb.	.01¼@.03½
Egyptian, crude	"	.05½@.06
Trinidad, refined	sh. ton	35.00
San Valentino (Italian)	lg. ton	16.00
Seyssel (French), mastic	sh. ton	21 00
Gilsonite, Utah, ordin'y	lb.	.03
Select	"	.03¾
BARIUM—		
Carb. Lump, 80@90%	sh. ton	$25.00@27.00
92@98%	"	26.00@29.00
Powdered, 80@90%	lb.	.01¾@.02
Chloride, com'l	100 lbs.	1.65 @1.70
Chem. pure cryst	lb.	.05
Nitrate, powdered	"	.05⅞
Sulphate (Blanc Fixe)	lb.	$0.02
BARYTES—		
Am. Crude, No. 1	sh. ton	9.75
Crude, No. 2	"	8.00
Crude, No. 3	"	7.00
Snow-flake	"	18.00
Foreign gray	"	13.50
Snow white	"	17.25
Floated	"	18.75
BAUXITE—Ga. or Ala. Mines: First grade	lg. ton	5.50
Second grade	"	4.75
BISMUTH—Subnitrate	lb.	2.00
Subcarbonate	"	2.25
BITUMEN—"B"	"	.03½
"A"	"	.05
BONE ASH	"	.02¼@.02½
BORAX	"	.07¼@.07½
BROMIDE—Bulk	"	.48
CADMIUM—Metallic	"	1.40
Sulphate	100 lbs.	2.00@2.50
CALCIUM—Acetate, gray	"	1.45
" brown	"	.90
Carbide, ton lots f.o.b. Niagara Falls, N. Y., for Jersey City, N. J.	sh. ton	65.00
Carbonate, ppt	lb.	.05
Chloride	100 lbs.	.70@.90
CEMENT—		
Portland, Am., 400 lbs.	bbl.	1.45@1.60
Foreign	"	1.75@2.25
"Rosendale," 300 lbs.	"	.80
Slag cement	"	1.25@1.50
CERESINE—		
Orange and Yellow	lb.	.13
White	"	.14
CHALK—Lump, bulk	sh. ton	3.00
Ppt. per quality	lb.	.04@.05¼
CHLORINE—Liquid	"	.30
Water	"	.10
CHROME ORE—		
(50% ch.) ex-ship N. Y.	lg. ton	24.75
Bricks f.o.b. Pittsburg	M	175.00
CLAY, CHINE—Am. com., exdock, N. Y.	lg. ton	8.25
Am. best, ex-dock, N. Y	"	9.25
English, common	"	10.75
Best grade	"	16.75
Fire Clay, ordinary	sh. ton	4.25
Best	"	6.00
Slip Clay	"	5.00
COAL TAR PITCH	gal.	.08
COBALT—Carbonate	lb.	1.75
Nitrate	"	1.50
Oxide - Black	"	2.50
Smalt, blue ordinary	"	.06
Best	"	.20
COPPERAS—Bulk	100 lbs.	.47½
In bbls	"	.52½
COPPER—Carbonate	lb.	.18@.19
Chloride	"	.25
Nitrate, crystals	"	.35
Oxide, com'l	"	.19
CRYOLITE	"	.06½
EXPLOSIVES—		
Blasting powder, A	25-lb. keg	.65
Blasting powder, B	"	1.40
"Rackarock," A	lb.	.25
"Rackarock," B	"	.18
Judson R.R. powder	"	.10
Dynamite (20% nitro-glycerine)	"	.13
(30% nitro-glycerine)	"	.14
(40% nitro-glycerine)	"	.15
(50% nitro-glycerine)	"	.16¼
(60% nitro-glycerine)	"	.18
(75% nitro-glycerine)	"	21
Glycerine for nitro	"	.12¼@.12⅝
FELDSPAR—Ground	sh. ton	@10.00
FLINT PEBBLES—Danish. Best	lg. ton	14.75
French, Best	"	11.75
FLUORSPAR—		
Lump	sh. ton	8.00@10.00
Ground	"	11.50@13.50
FULLER'S EARTH—Lump	100 lbs.	$0.80
Powdered	"	.85
GRAPHITE—Am. f.o.b. Prov. idence, R.I., lump	sh. ton	8.00
Pulverized	"	30.00
Am. pulv., other than R. I., f. o. b., New York	"	45.00
Best flake	"	150.00
German, com. pulv	lb.	.01¼@.01½
Best pulverized	"	.01½@.02
Ceylon, common pulv	"	.02¾@.03½
Best pulverized	"	.04@.08
Italian, pulverized	"	.01¼
GYPSUM—Ground	sh. ton	8.00@8.50
Fertilizer	"	7.00
Rock	lg. ton	4.00
English and French	"	14.00@16.00
INFUSORIAL EARTH—Ground. American best	"	20.00
French	"	37.50
German	"	40.00
IODINE—Crude	100lbs	2.45
IRON—Muriate	lb.	.05
Nitrate, com'l.	"	.01¼
True	"	.04
Oxide, pure copperas color	"	.05@.10
Purple-brown	"	.02
Venetian red	"	.01@.01½
Scale	"	.01@.03
KAOLIN—(See China Clay.)		
KRYOLITH—(See Cryolite.)		
LEAD—Acetate, white	lb.	.08½ @ .8¾
Brown	"	.06½@.06¾
Nitrate, com'l	"	.06½
" gran	"	.08¼
LIME—Com., abt. 250 lbs	bbl.	.80
Finishing	"	1 00
MAGNESITE—Greece. Crude (95%)	lg. ton	5.00@5.50
Calcined	sh. ton	15.50
Bricks, best imp., f.o.b. N.Y.	M.	155.00
Bricks, domes., per qual., f.o.b. Pittsburg	"	160.00@200.00
MAGNESIUM—		
Carbonate, light, fine pd	lb.	.05
Blocks	"	.07@.09
Chloride, com'l	"	.01¾
Fused	"	.20
Nitrate	"	.60
Sulphate	100 lbs.	.75@.95
MANGANESE—		
Crude powd. 70@75% binoxide	lb.	.01¼@ 01½
75@85% binoxide	"	.01½@.02¼
85@90% binoxide	"	.02¼@.03¼
90@95% binoxide	"	.03¼@.05½
Carbonate	"	.16@.20
Chloride	"	.04
Ore	unit	.12@.20
MARBLE—Flour	sh. ton	6.00@7.00
MERCURY—Bichloride	lb.	.77
MICA—N. Y. gr'nd, coarse	sh.ton	33.00@38.00
Fine	lb.	.00¾@.02
Sheets are sold as to size and quality		
MINERAL WOOL—		
Slag, ordinary	sh. ton	19.00
Selected	"	25.00
Rock, ordinary	"	32.00
Selected	"	40.00
NICKEL—Oxide, No. 1	lb.	1.00
No. 2	"	.60
Sulphate	"	.20@.21
OILS—Black, reduced 29 gr. 25@30, cold test	gal.	13@.13¾
15, cold test	"	.13¾@.14¼
Zero	"	.18¼@.19¼
Summer	"	.12¾@.13¼
Cylinder, dark steam ref	"	.14¼@.16¼
Dark, filtered	"	.18¼@.19½
Light, filtered	"	.20¼@.21¼
Extra cold test	"	.24¾@.31¼
Gasoline, 86° @90	"	.17@.22
Naphtha, crude, 68°@72°	bbl.	12.40
"Stove"	gal.	.15
Linseed, domestic raw	"	.38@.42
Boiled	"	.44
Calcutta, raw	"	.65
OZOKERITE	lb.	.11½
PAINTS AND COLORS—		
Chrome green, common	"	.03
Pure	"	.16
Yellow, common	"	10¾
Best	"	.14
Lampblack, com'l	"	.04½
Refined	"	.07
Litharge, Am. pow'd	"	.05¼@.05¾
English Glassmakers'	"	.08¼@.08⅝
Metallic, brown	sh. ton	19.00
Red	"	16 00
Ocher, Am. common	"	8.50@9.00
Best	"	21.25@25.00
Dutch, washed	lb.	.02¼
French, washed	"	.01¼@.01⅞
Orange mineral, Am	"	.07⅝@.07¾
Foreign, as to make	"	.08¼@.10¼
Paris green, pure, bulk	"	.11
PAINTS AND COLORS—		
Red lead, American	lb	$0.06¼@$0.06½
Foreign	"	.07@.08¼
Turpentine, spirits	gal.	.57½
White lead, Am., dry	lb.	.04¾@.05
American, in oil	"	.05¾@.06½
Foreign, in oil	"	.09 @.09½
Zinc, white, Am., ex. dry	"	.04⅝@.04¾
Foreign, red seal, dry	"	.06@.08½
Green seal, dry	"	.06½@.09½
POTASH—		
Caustic, ordinary	"	.04¼@.04⅞
Elect. (90%)	"	.06¼
POTASSIUM—		
Bicarbonate cryst	"	.08¼
Powdered or gran	"	.14
Bichromate, Am	"	.08¼@.08¾
Scotch	"	.08⅝@.08¾
Bromide	"	@.30
Carbonate (80@85%)	"	3 75@4.00
Chlorate, powdered	"	.06¾@.07¼
Crystals	"	.06½@.07
Chromate	"	.35
Cyanide (98@99%)	"	.19 @.20
Kainit	lg. ton	9.30
Manure salt, 20%	100 lbs.	.66
D'le Manure Salt, 48@53%	"	1.12
Muriate, 80@85%	"	1.83
95%	"	1.86
Permanganate	lb.	.09¼@.09⅝
Prussiate, yellow	"	.14¾@.14⅞
Red	"	.36 @.36¾
Sulphate, 90%	100 lbs.	2.11
96%	"	2.14
Sylvanit	unit	.41
QUARTZ—(See Silica.)		
SALT—N. Y. com. fine 280 lbs.	bbl.	.72@1.18
N. Y. agricultural	sh. ton	4.40
SALTPETER—Crude	100 lbs.	3.50
Refined	"	4.00@4 50
SILICA—		
Ground quartz, ord'ry	sh. ton	9.00@10.00
Best	"	12.00@13.00
Lump quartz	"	2.50@4.00
Glass sand	"	2.75
SILVER—Chloride	oz.	.65
Nitrate Crystals	"	.35½
Oxide	"	.85@1.10
SODIUM—		
Bicarb., ord., bulk f.o.b. works	100 lbs.	1.30
Extra domes., f. o. b. works	"	3.50
Bichromate	lb.	.06⅜
Carbonated ash, high test, in bags, f.o.b. works	100 lbs.	.72½@.80
Foreign, f.o.b. N. Y.	"	.90@.92½
Caustic, 70@76%, f. o. b. works	"	1.75@1.90
Foreign, f.o.b N. Y	"	1.90@1.95
Chlorate, com'l	"	.06¾@.07
Hyposulphite, Am	"	1.60@1.65
German	"	1.70@1.90
Nitrate, spot and nearby	"	2.25
Shipments	"	2.12½@2.15
Peroxide	lb.	.45
Phosphate	"	.02½@.02¾
Prussiate	"	.09½
Sal soda, f.o.b. works	100 lbs.	.90
Foreign, f.o.b. N. Y.	"	.67½
Silicate, concentrated	lb.	.05
Com'l	"	.01
Sulphate, com'l	100 lbs.	.82½
Sulphide, crystals, bbl.	lb.	.01¾
Sulphite crystals	"	.02½
SULPHUR—Roll	100 lbs.	1.85
Flour	"	1.90
Flowers, sublimed	"	2.20
TALC—N. C., 1st grade.	sh. ton	20.00
N. Y., Fibrous, best	"	10.25
French, best	100 lbs.	2.50
Italian, best	"	2.25
TAR—Regular	bbl.	2.25
Oil, bbl	"	4.10
TIN—Crystals, bbl	lb.	.21
Oxide	"	.35
URANIUM—Oxide	"	2.25@3.00
ZINC—Metallic, ch. pure	"	.07@.09⅜
Carbonate, ppt	"	.09
Chloride so ution, com'l	"	.02¾
Chloride granular	"	.04⅝@.04⅝
Dust	"	.05@.05½
Sulphate	"	.02 @.02¼

THE RARE EARTHS.

BORON—Nitrate	lb.	$1.50
CALCIUM—Tungstate (Scheelite)	"	.60
CERIUM—Nitrate	"	10.00
DIDYMIUM—Nitrate	"	35.00
ERBIUM—Nitrate	"	40.00
GLUCINUM—Nitrate	"	20.00
LANTHANUM—Nitrate	"	30.00
LITHIUM—Carbonate	"	1.35
LITHIUM—Nitrate	oz.	.60
STRONTIUM—Nitrate	lb.	.07⅛@.08¼
THORIUM—Nitrate 49@50%.	"	4.50
URANIUM—Nitrate	oz.	.25
ZIRCONIUM—Nitrate	lb.	8.00

NOTE.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. Readers of the ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable.